The
SHIPPING WORLD
AND SHIPBUILDING & MARINE ENGINEERING NEWS

VOL. CXXV No. 3046 WEDNESDAY, NOVEMBER 14, 1951 Price 1/6

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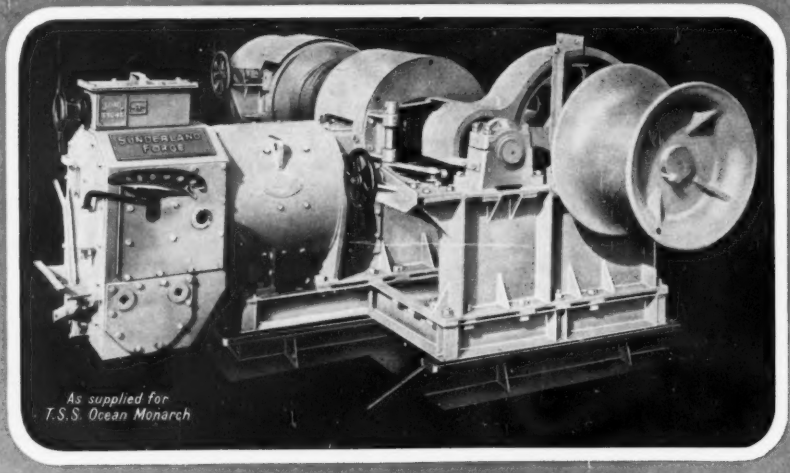

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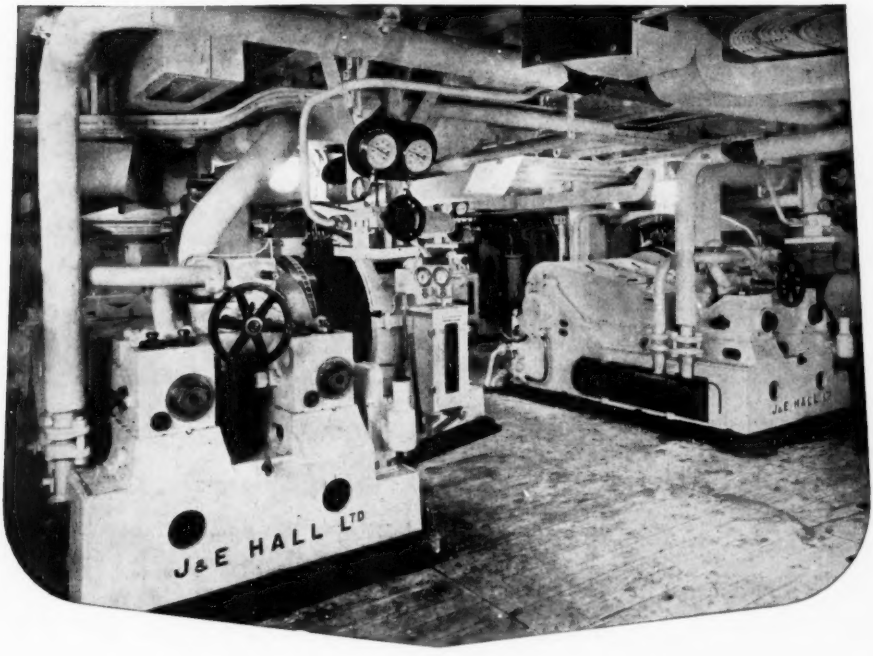

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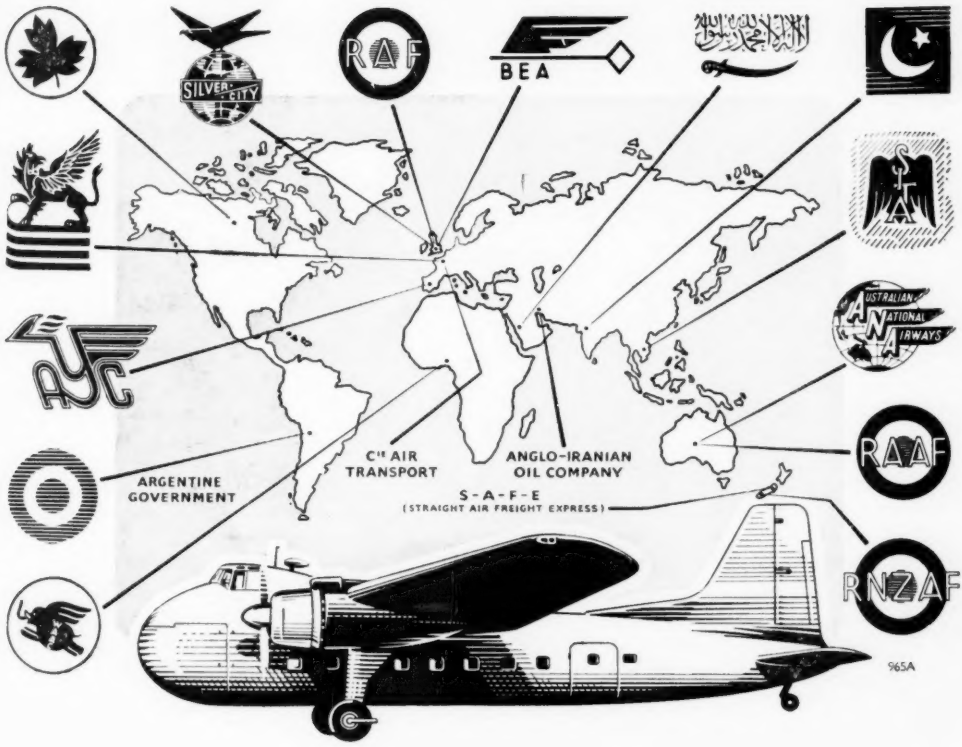

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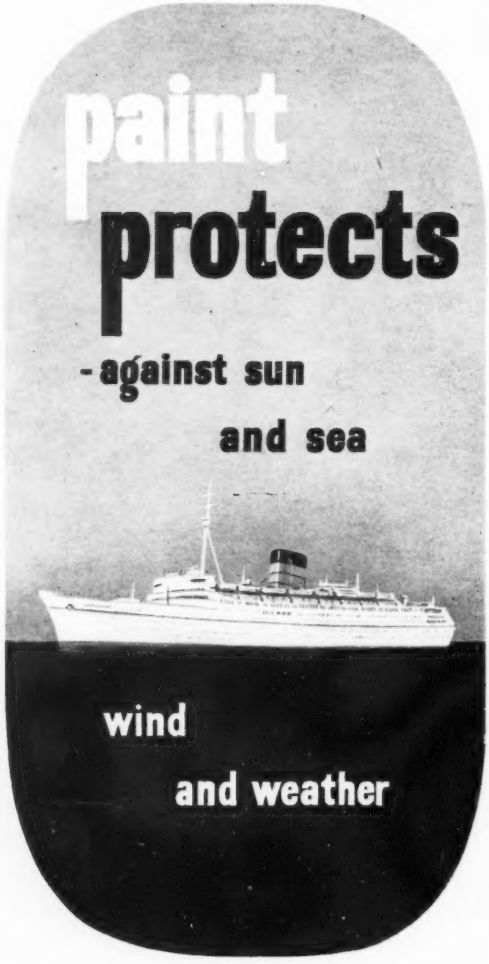

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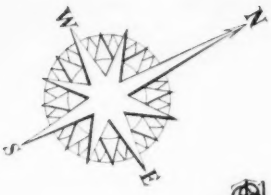

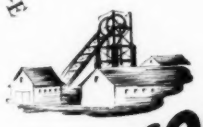

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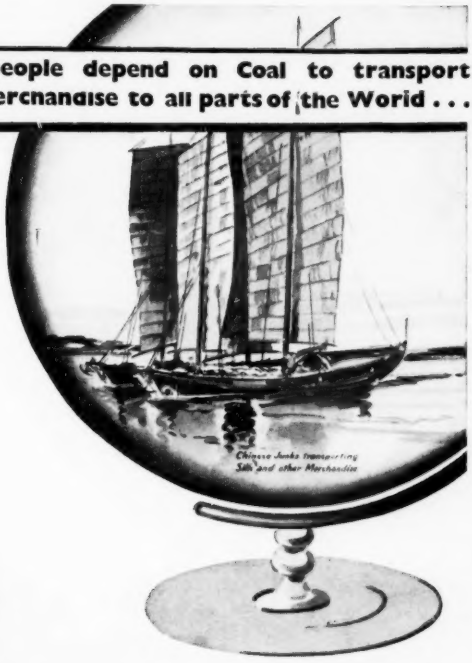

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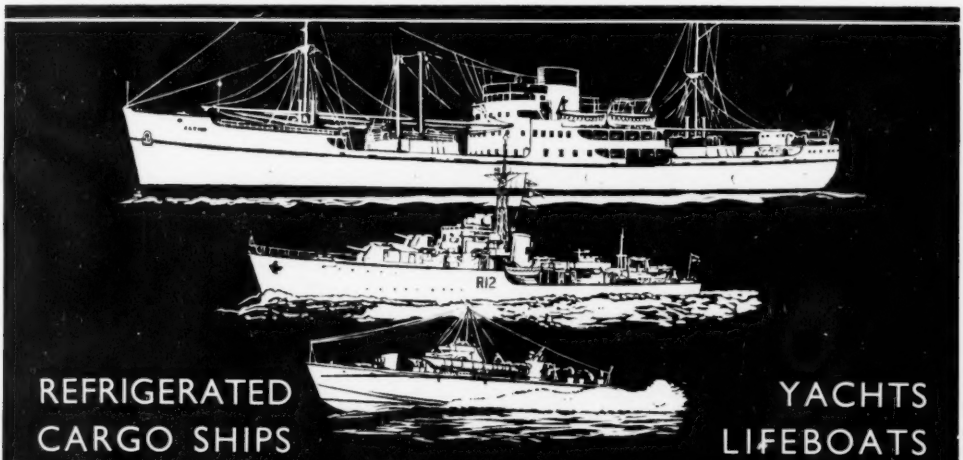

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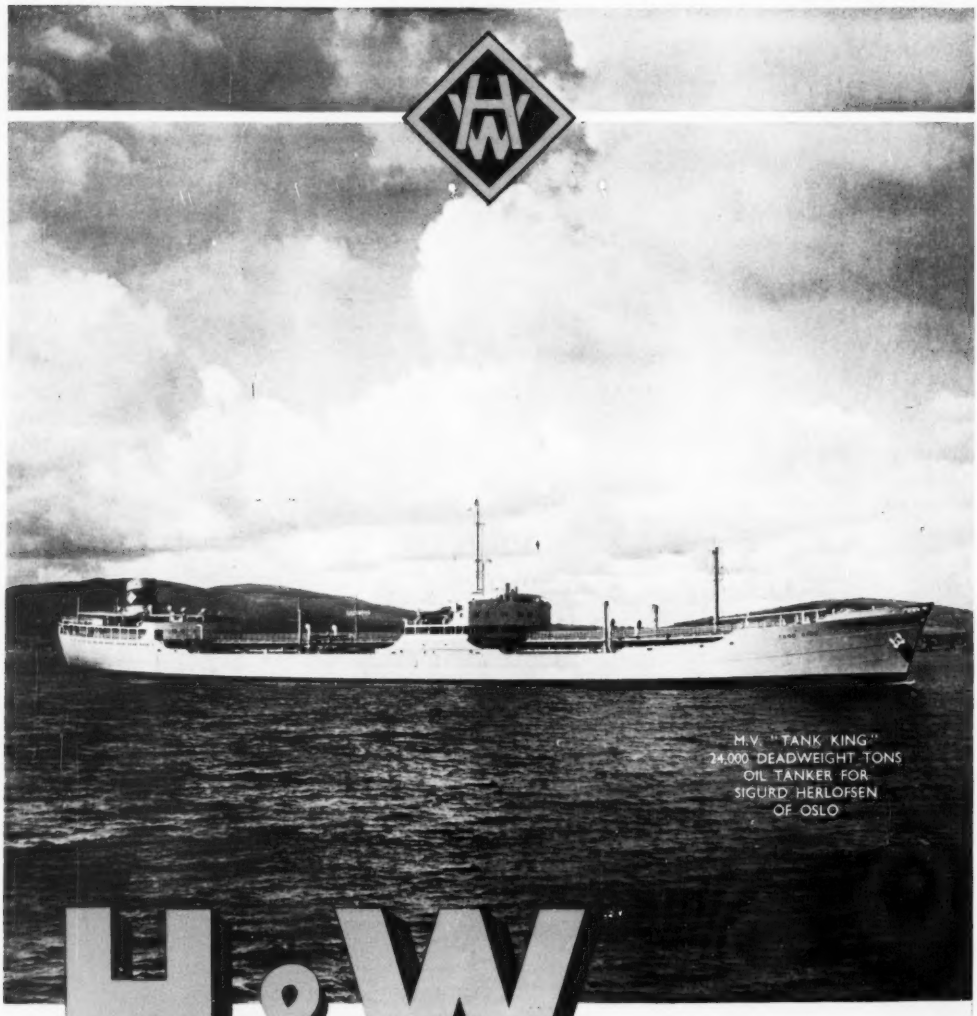

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Editor :—PETER DUFF *Managing Editor* :—RONALD KENDALL, M.C.M.S., A.M.I.N.A. *Advertisement Manager* :—M. B. FIELD

Annual Subscription 70s.

Head Offices : 1, Arundel Street, London, W.C.2. (Temple Bar 2523) *Northern District Manager : W. S. Wilson, M.I.E.E., 27 Exchange Buildings, Newcastle-on-Tyne. Telephone : Newcastle 27078*

Telegrams : "Shipping World," London

Vol. CXXV. **WEDNESDAY, NOVEMBER 14, 1951** **No. 3046**

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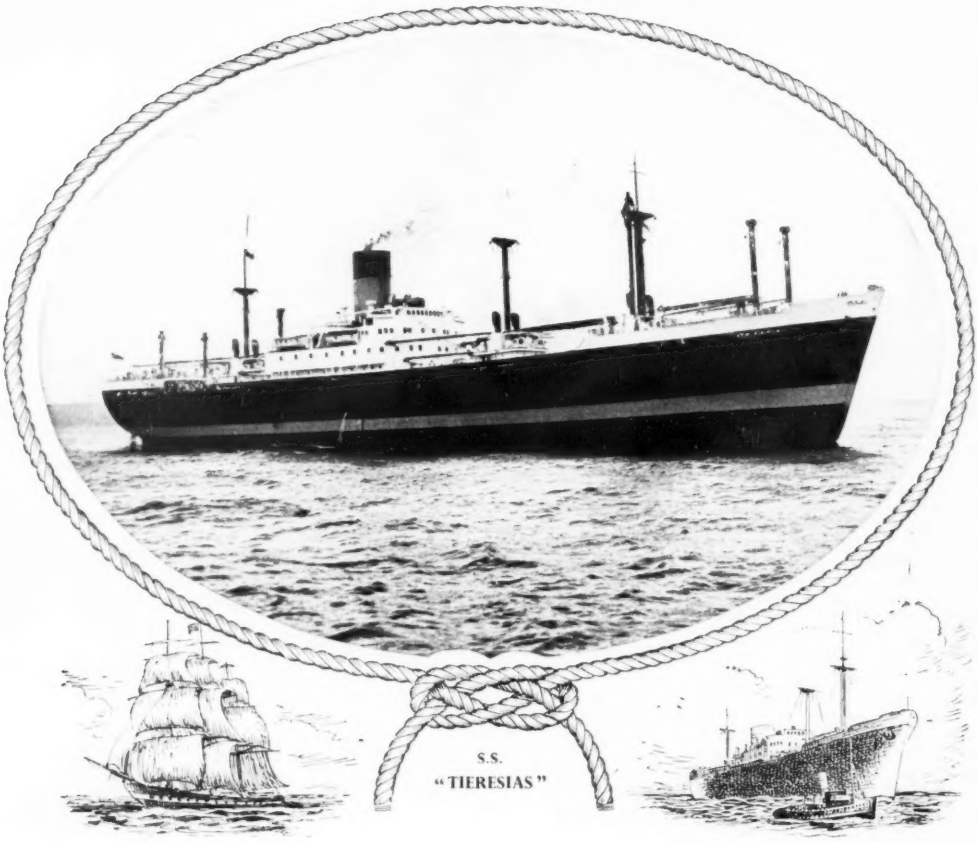

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THE NEED FOR A NEW "ECONOMY" SHIP

BRITISH SHIPYARDS in general are booked up with orders for some years ahead. That is a most satisfactory position, particularly for an industry which has known bad times on several occasions in its history. It is recognised, however, that a great deal of the present prosperity in the industry is owed to the oil industry of this and other countries, for tankers predominate largely both in ships under construction and on order. There is no sign that further orders for oil tankers will not be placed, though one leading oil spokesman has warned against the danger of building too many "super" tankers by charter companies, owing to the specialised character of such ships. Meanwhile, it must not be forgotten that a great deal remains to be done towards making our cargo fleets modern and efficient for the competitive years ahead. The report of the Council of the Navigators' & Engineer Officers' Union referred to this matter some weeks ago, mentioning that some 58 per cent of the liner and tramp fleets of Britain comprises ships nearing the end of their period of service owing to age or wartime limitations on design and building. The report referred, rightly, to the need for ploughing back more of the profits from shipping into building new ships. It may confidently be anticipated that the new Secretary of State for Transport, Fuel and Power, and the new Minister of Transport, will use all their influence, based on their close knowledge of the industry, to remedy the anomaly whereby a country largely dependent on maritime earnings is levying taxation calculated to militate against earnings in future years.

The plain fact is, however, that steel is in short supply owing to the heavy demands of our new export trades and rearmament. Even though the present Government is one which may be expected to recognise that ships are both economic tools and defensive weapons, it is difficult to escape the belief that the limiting factor in shipbuilding for some time to come, in this country and elsewhere, will be the amount of steel available. The best possible use must, therefore, be made of the supplies which will be given to the shipyards. No shipowner can afford an uneconomic ship at any time; for years ahead it may also be said that this country cannot afford to have any but the most efficient ships built. What a challenge this represents to British shipbuilders, never slow to meet and defeat any difficulties which arise. Can further economies in the use of steel be made, and, in particular, when the present programme of cargo ship construction becomes greater, as it must? In many shipyards great progress has been made with the application of welding and prefabrication, enabling hundreds of tons of steel to be saved each year. What is now required is a re-examination of the design of the tramp of the future in the light of welded technique and the pressing shortage of steel.

Obviously, the first step lies with shipowners in the tramp section. Do they wish to base their building programmes on the 10,000 tons deadweight size, bought relatively cheaply? Or would they consider a new "economic" size of between 7,000 and 8,000 tons deadweight, and of higher and more economic speed than the Liberty ship, but with a draught shallow enough to serve ports where new sources of materials are to be developed? Having determined this basic factor, the naval architect can begin. Working with Lloyd's Register and the Ministry of Transport, much could be done to simplify structural construction. Hastening tonnage reform would enable more cubic capacity to be provided in each new ship, while an incentive would be given to placing propelling machinery aft, making holds more easily loaded and discharged. Perhaps sheer could be omitted, building up bulkwarks and forecastle sides in thinner steel than used for a shell with normal sheer, to maintain decks free from the sea. The scope is wide and the prize worthy of attainment. And it is better to plan now, when the yards are full, than at any other time.

Current Events

Freedom for Steel

THE SOCIALISTS will, of course, put up a fight when the Bill dissolving the Iron and Steel Corporation is discussed in the House of Commons early next year, but, if anticipations as to the character of the legislation are fulfilled, they will have little into which to get their teeth. The new board will be thoroughly representative of the Government, of the managements, of the consumers and of the workers and it will, like its predecessor, which worked so well, be responsible for the general direction of the industry. The Bill will undoubtedly receive the support of the little body of Liberal M.Ps, for it is in line with their own ideas. It will, in fact, follow fairly closely the scheme which was laid before the Trades Union Congress about a year ago, which the Prime Minister endorsed. The new board will probably consist of two representatives of the British Iron and Steel Federation, the central organisation of the privately-owned steel companies, two representatives of the trade unions, an official Government representative and an independent chairman. It is a fortunate circumstance that the nationalisation scheme was put into force so recently that it will not be a difficult matter to repeal the Act, and it can be said that the Government has a mandate in support of its policy, which was certainly not the case when the nationalisation legislation was passed. In fact, even the T.U.C. is not satisfied with the working of

the schemes which have already been carried out. As Sir Richard Coppock has said, the workers realise that nationalisation does not spell Utopia.

An International Problem

MR. R. G. M. STREET, managing director of the South American Saint Line, has made a well reasoned plea for a quicker turnround of ships in the ports of the world. Faster and better equipped ships are now being built at what even ten years ago would have been regarded as fantastic prices, but they have to spend the greater part of their effective lives in a state of costly inactivity, with the result that, operating costs being as high as they are today, freights have to be raised. "It gives me no pleasure to see the high rates which have to be charged to operate ships," Mr. Street declared. "The problem is not a local one, but the effect of this malady, which has been affecting the rest of the world for some time, is only now being felt in this country." Of course, the root cause of the shortage of shipping space and the consequent increase in values and rates is not, as he pointed out, an insufficient number of ships. The trouble is that so many are being so handled that only three-quarters of their available space is being used and round voyages often take 25 per cent longer in time, despite the increased speed of ships, because they are being held up in port sometimes for weeks. Mr. Street declared that in recent months London, Liverpool and Hull had equalled some of the worst foreign ports. In Lord Leathers, the shipping industry now has a Minister who can appreciate the gravity of the crisis in the ports, which is due, in large measure, to agitators who are working on a worldwide plan to delay ocean transport, organising strikes first in one port and then in another. Today it is New York, but tomorrow it may be London, Glasgow or Newcastle-upon-Tyne. There is never a time when peace reigns in all the ports of the world, and the cost to the trading community, and ultimately to producers and consumers, is incalculable.

A Justified Protest

THERE was never a time in the history of the shipping industry when Governments, almost without exception, placed so many obstacles to successful trading, which involves businesslike planning. An owner must know what the costs will be before he can enter into a contract and yet Governments, which boast of economic planning are themselves offenders against the light. Quite recently Poland has been imposing, without notice, increased charges on shipowners. In the summer the managers of the Baltic & International Maritime Conference learnt of the increases in Polish port charges through disbursement accounts and in no other way. The Polish authorities were approached with the suggestion that it would be fair to give all owners interested express advice beforehand of the new charges, and that they should first be made operative on September 1. The appeal was unavailing. It is most unfortunate if, in an international industry like shipping, owners are not able to rely on the official tariffs available to the public being respected. They should, it is urged, have full particulars of the tariffs and of any planned alterations and increases well in advance, in order to be able to make proper calculations and take the actual expenses into account for the purpose of fixing the rates of freight. In the Conference's latest circular, figures are given showing that in some cases the Polish charges have been raised by as much as 55 per cent since July 1.

The Importance of Profits

THE SPEECHES of Colonel A. C. Tod, chairman of Elder Dempster Holdings, Ltd., are always refreshing and especially just now when politicians have been indulging in euphemisms at the hustings. He speaks as he thinks, without any nonsense. When discussing the other day his company's replacement programme, he explained that they had been able to go ahead with it because they had made profits and he added that he was "an unrepentant believer in profits." It is certain that without profits there can be no Welfare State, just as without harder work by brain and hand the whole ideal must disappear. Profits are the lifeblood of industry, and always have been its lifeblood and must in the future be its lifeblood, as even many of the former advocates of nationalisation are beginning to realise. Without profits, as Colonel Tod remarked, they would get no new ships if the owner could not get money to pay for them. If they did not earn large profits they could not replace ships as they wore out, and ships now cost over three times the historical value of those they replaced. It may be hoped that the new Government, by cutting out a great deal of wasteful expenditure, may be able to restore the initial allowances and perhaps give other aid to shipowners so that they may be in a position not only to replace their obsolete ships, thus assuring employment to seafarers, but to add to their fleet as opportunity offers. They should be encouraged to be adventurous, earning profits and thus enriching the whole country.

Financial Strength

THE LATEST report of Ellerman Lines, Ltd., relates only to the calendar year 1950 and covers a period mainly of falling or static freight rates. These did not begin to rise until the closing months of the year. It is not, therefore, surprising to discover from the group accounts that trading profits declined from £2,731,000 to £2,054,000. Of this total, the unseparated provisions for depreciation, deferred repairs and contingencies—the amount involved is £2,178,000—take the larger part. The tax charge is £134,000 only, the smallness of this figure being due to the temporary fiscal benefit that will have derived from the initial allowances. There is then left a net profit of £132,000, which amply covers the net dividend requirement of £41,600 on the preference and preferred capitals and the maintained 10 per cent, tax free, on the privately held deferred stock. The total of consolidated assets is now £30,330,000, of which ships, at cost less depreciation and reserves, including payments on account of new tonnage, account for £16,505,000. At the year-end, the group had 89 vessels aggregating 583,500 tons gross in commission, with a further five ships, totalling 61,000 tons, under construction or contracted for. Capital commitments at that date were £7,600,000. Cash holdings were £1,866,000, with a further £1,571,000 on deposit, while quoted investments (apart from shares of £1,229,000 in marine insurance companies) had a book value of £3,650,000, by contrast with a then market value of £4,574,000. The company makes such extensive use of the non-disclosure concessions granted the shipping industry by the Exemption Order that it is difficult accurately to measure the strength of its financial position. It may be taken for granted, however, that group finances are in first-class condition. Much of the clumsy omnibus item (£23,427,000), which houses a mixed bag of reserves and provisions, must be in the nature of *general* reserves: there is also a substantial carry forward of £948,000. Profits should show a useful expansion in the current year.

Fresh Capital

THE FIRM of John I. Thornycroft & Co., Ltd., shipbuilders, shiprepairers and motor and general engineers, is to raise additional capital for reasons stated by the chairman in his commentary on the full report of this company, for the year ended July 31 last. All sections of the company, he says, are participating in the rearmament programme, which necessitates considerable expenditure on improvements and replacements of buildings and plant. It has also been necessary to invest further sums in overseas subsidiaries and branches for the development and growth of export sales. These commitments will together call for heavy outlays and the chairman, Sir John E. Thornycroft, mentions that, in addition to the capital commitments

of £86,000 noted on the group balance sheet, the board has authorised a programme of renewals and additions totalling £250,000 over the next three or four years. Thus, with tax continually denuding the company of liquid resources, it will be necessary to increase these by resort to the new issue market, despite the fact that at the close of the financial year the group held £1,366,000 in cash and £260,000 in tax certificates. Consolidated reserves at £1,655,000 (excluding future tax of £549,000) are of ample proportion, especially as fixed assets have been drastically written down. Group profits totalled £1,161,000, compared with £1,049,000, and included contract receipts relating to earlier years amounting to £475,000, against £184,000, and special credits of £80,000. Results cannot, therefore be closely compared and that, indeed, is common experience in industries which, like shipbuilding, work on long-term contracts of high value. The ordinary dividend costs no more than £47,250 net and consists of an interim payment of 10 per cent on an increased capital of £600,000, following the share bonus distribution of 100 per cent. It is thus an effective increase of 2½ per cent. The group's order books are full, but the chairman stresses that shortages of skilled labour and of raw materials and the impact of rearmament may hinder output.

Iron Trades Insurance Development

WITH the coming year the Iron Trades Mutual Insurance Co., Ltd., will enter on a new marine underwriting venture which will probably lead to important developments. The company is a subsidiary of the Iron Trades Employers' Insurance Co., Ltd., which has a membership composed of over 300 leading British engineering firms and practically every shipbuilding firm in the United Kingdom. The account of the Iron Trades Employers is substantial; in 1950 its premiums approached £2,000,000 and its assets amounted to more than £5,500,000. The Iron Trades Mutual, however, out of consolidated premiums of £207,000 in 1950, wrote marine premiums amounting only to £947 and the marine fund at the end of the year was £3,808 (over 400 per cent of the premiums) but the figures involved are very small. From January 1, 1952, however, Bland, Welch & Co., Ltd., have been appointed marine underwriting agents. During the five years since this firm was appointed marine underwriting agent by the London & Edinburgh Insurance Co., Ltd., that company has built up a premium income of nearly £350,000 in 1950 and, at the end of that year, had a marine fund of 160 per cent of the premiums, after transferring £54,000 to profit and loss account. It may thus be anticipated that the Iron Trades Mutual will develop along similar lines. The new account will be written in the same underwriting room as that of the London & Edinburgh, which means that, in addition to the business which will naturally flow to it from the members of the parent company, it will enjoy a "show" of the general business of the marine market, while the London & Edinburgh and other companies of the same group may expect to enjoy a share of the selected business emanating from the new member. This is an example of the modern tendency of marine underwriting by which one underwriter, acting for a group of companies, can operate on a scale far less limited than is possible in the case of an individual account written for a single unit of the market.

North Atlantic Air Chartering

A WELL-KNOWN firm of air brokers on the Baltic Exchange has drawn attention to what it describes as the "ridiculous situation" which exists for air chartering on the North Atlantic route. Operators, it appears, have bound themselves to a fixed charter rate. Those who wish to run charter flights must file a rate with the U.S. Civil Aeronautics Board, and although they may quote higher rates they must not quote below the fixed rate. It is obvious that no one can foretell a month or more ahead what a reasonable quotation may be, and even operators who are making one-way positioning flights are compelled to quote round-trip rates by this rule. In this way the competitive spirit, which is the very essence of air chartering, has gone right out of this market. The net result, indeed, is that air chartering in this market has been extremely difficult, and operators have lost most of the potential traffic to sea transport. It is not known whether operators have raised any protest against this pernicious system, or even whether they have had any opportunity of doing so; but it is pertinent to ask what they expect to achieve, or what they are trying to protect, by adhering to such a restrictive agreement. If the scheduled airlines adhere to it much longer, or even allow it to spread to other markets, they will lose charter business altogether, or else they will be committing themselves to invariably low rates and suffer economic loss.

Elastic and Plastic Analysis of Structures

IT IS now some ten years since Professor J. F. Baker, who holds the chair of Mechanical Science at Cambridge, presented his valuable paper on the application of plastic theory to design of structures to the North East Coast Institution of Engineers & Shipbuilders. It was to be expected therefore that, in giving the twentieth Andrew Laing lecture before the same institution on November 9, the author would return to this important subject. On this occasion the title of the paper was "The Shortcomings of Structural Analysis." Professor Baker referred to the fact that though elastic analysis could be depended on to give sufficiently accurate values of the stresses in any structure where the character of the connections was known and the members and foundations were without imperfections, these conditions were not in fact satisfied where real structures were concerned, examples being quoted showing how far the real stresses were from those calculated. In the case of one land structure where symmetrical loads were applied to a beam the discrepancies at different floor levels varied from 4 to 30 per cent. He also mentioned the incidence of residual stress as complicating the analysis, stating that it was now recognised that with welded connections the sum of reaction and residual stresses normally reached the yield point in the vicinity of the weld. The author referred to the example concerning residual stresses in a welded tanker under construction, as reported to the Chesapeake section of the American Society of Naval Architects and Marine Engineers, in which stresses of the order of 8 tons per sq. in. existed at points far removed from the weld. Professor Baker contended that the elastic behaviour of structures was far too complex to assist the designer and pointed out the advantages of using a simple plastic theory to determine, not the maximum permitted stress, but the load at which a structure would fail or develop unduly large deflections.

SAYINGS OF THE WEEK

A TRADE UNIONIST'S CONFESSION

"I doubt whether much progress can be made with nationalisation until everyone concerned is imbued with a sense of social responsibility."—*Sir Richard Coppock*, general secretary of the National Federation of Building Trades Operatives.

A SOCIAL SORE

"This year alone the company's losses from stealing in all centres to which we trade will be not less than £250,000. Are you doing what you can to prevent this? Are you all treating it as a real social sore in our community?"—*Colonel A. C. Tod*, chairman of Elder Dempster Holdings, Ltd.

THE GRINDSTONE OF COMPETITION

"Nothing is worse for us than not having to sharpen our wits on the grindstone of competition. . . . At present, some of us are basking in a period of over-demand and under-supply, and though it is pleasant, and even good for a short time, it is enervating, and in the long run bad for us."—*Mr. D. F. Anderson*, chairman of the Shipping Federation.

ON THE "BALTIC"

BALLASTING FROM THE PLATE AND AUSTRALIA

By BALTRADER

THE SUDDEN rise of 10s. per ton in freight rates from the River Plate to the Continent does not indicate that we may look for a continuous demand for tonnage in that quarter. There is not enough grain available or likely to be forthcoming to make a large contribution to employment. In fact, the prospects of the Plate market are discounted for at least a year by the experts. The market jumped because a quantity of grain was sold, sufficient to occupy a number of ships whose owners were able to be independent of homeward Plate cargoes because alternative markets offered better opportunity. No tramps have gone near the Argentine for many months, unless with outward cargo at a rate which would ensure a satisfactory round in spite of a long ballast trip from the Plate to the homeward loading port. Vessels have, after discharge in Buenos Aires, gone in ballast to West Africa to load ore homewards; others have proceeded to the Gulf of Mexico to bring a cargo of phosphate to Europe. A third alternative which has been used is a ballast trip from the Argentine to the North Pacific, followed by a voyage home with lumber. The poor rates offered for the direct voyage from the Argentine to Europe have almost denuded the Plate of tramp tonnage, which explains the recent predicament of charterers who required a few ships.

A similar process has been in operation in the Australian market. Just as the Argentine had to pay high rates to get tonnage to go there from Europe and the United States with coal, Australia has been obliged to attract shipping to herself from Europe by the payment of ever increasing rates to satisfy her requirements of general cargo and motor cars. Like the Argentine, Australia has had little or nothing to offer in the way of employment to follow. In these days, however, owners have vessels which can move in ballast for great distances with comparative economy, especially the modern diesel ships. This enables owners to resist the efforts of charterers to gain by a concentration of tonnage in a particular area. It tends to equalise the various markets of the world and to check, to some extent, extremes of height or depth in freight values. The Australian grain charterers' operations for new season chartering should now be in full swing; they have orders to fill but their idea of rate is 20s. or more below that which is acceptable to owners.

Outlook for North American Market

The yardstick which owners have employed to measure the value to them of an Australian grain cargo is the return obtainable from a ballast passage to North America and a voyage from there with cargo. It has generally involved a run to the North Pacific, but some vessels have gone instead from Australia to the Gulf of Mexico, attracted by the high rates paid for the voyage from there to Europe. In the past week, the Ministry of Food and the Timber Control have reduced their demands for tonnage and have secured a small reduction of freight both from the North Pacific and from the Gulf. It may be that North America will, in the coming months, offer somewhat less support to the Australian market than of late; but it would be dangerous for charterers to rely too much on that. There is the probability that North American exports to Europe will continue in great quantity, especially in the case of coal. Even if fewer ships than of late will be drawn to North America from Australia, the Australian charterers will soon have to take many more ships than they have required for a long time. Australia's surplus of wheat is expected to be less than last year, but it will be considerable; there are barley and oats to be shipped as well. It seems likely that the Ministry of Food will eventually make a rather higher bid for tonnage to supply its new season requirements.

A factor of the freight position in the Pacific area is the present lack of chartering from Manchuria and North China. It is now a between-season time and, furthermore, there is no information as to how much of grain and soya beans will be released for export from that region. If the activity of the past 18 months is resumed, some of the shipping formerly engaged in that trade will be no longer available on account of the Panamanian Government's embargo on trade with Communist countries. Developments in that area will be watched with interest.

The Freight Market

Freight markets have been influenced in some directions by a falling off in inquiry on behalf of the Ministry of Food. On the other hand the liner companies have been active in chartering on time basis at good rates of hire. While the strong North American market has weakened a little, the weak River Plate has become firmer. Coal chartering from the U.S. is less active but charterers have again covered some of their requirements well ahead with consecutive voyages. Recent fixtures of this kind are: *Oxford*, 9,000 tons, U.S.N.H. to Antwerp or Rotterdam, $10.50, with options, consecutive voyages from January to October next year; "Orion" tonnage, Hampton Roads to Antwerp or Rotterdam, $10.50, option Germany $10.95, ten cargoes between December and June. Last week the Ministry of Food fixed the *Centaurus* for grain from St. Lawrence to U.K. or Continent at 26s. 3d. per quarter, November 8/14. The *Baron Murray*, 9,000 tons, accepted 120s. for sulphur from Galveston or Port Sulphur to U.K., January 7/28; this was a decline of 4s. from the last rate paid. The *Baluchistan*, 9,6/9,800 tons, 493,000 ft. bale, is fixed from North Pacific to U.K. at the lower rate of 167s. 6d. f.i.o., lumber and general cargo, January 25/March 5. Cross voyages from the North Pacific offer interesting employment on voyage and time charter basis. The *Hoperidge*, 9,000 tons, 10 per cent. is fixed for heavy grain from North Pacific to East Coast India at 172s. 6d., option West Coast India 175s., January 25/February 25. The *Stratidore*, 8,300 tons, 10 per cent, is fixed for wheat in bulk, British Columbia to Capetown-Durban range at 192s. 6d., January 1/20. The Mediterranean is quiet and rates for ore and phosphate are easier. Casablanca to U.K., phosphate, has been accepted at 57s. November, 56s. December, and 55s. January. Time charter fixtures include: *Carlton*, 10,012 tons d.w., 476,000 ft. bale, 9¾ knots on 22 tons oil, a trip to Australia at 60s. per month, delivery U.K., December 18, and *Star of Luxor* (m.v.), 6,700 tons, 340,000 ft., 14 knots on 15 tons, a trip to Bombay, delivery Los Angeles, December 5/24, $11.75 per month.

Air Charter Business

Inquiry for aircraft on charter has improved. There has been good demand for carriage of ships' crews and spare parts for renewal and repair. Air transport has enormously assisted owners to operate their vessels for long periods away from their home bases. Some loss of employment may be suffered as a result of the restrictions which are being introduced in our trade with European countries, but freight traffic by air between the United Kingdom and Continent is not usually the most profitable business available. Government employment of chartered planes is an important factor, especially for transport of service personnel between the U.K. and Middle East.

LONDON & OVERSEAS FREIGHTERS, LTD.

AMBITIOUS BUILDING PROGRAMME

Mr. Basil M. Mavroleon on the Year's Operations

THE third annual general meeting of London & Overseas Freighters, Ltd., was held on November 12 at the Baltic Exchange, St. Mary Axe, London, E.C. Mr. Basil M. Mavroleon, chairman and managing director, presided. The following is his statement, which had been circulated with the report and accounts for the year ended March 31, 1951:—

Many changes as they affect our business, both of an international and domestic nature, have taken place since I wrote my review of the company's activities a year ago.

The recession in the tramp shipping industry, to which I then referred, has been transformed into a boom period, bringing with it high freights and an unprecedented rise in the market values of secondhand ships. Your directors have taken advantage of the high prices offered by foreign buyers to dispose of four dry-cargo ships during the period under review. These sales realised a surplus of £359,914 over the book values of the ships concerned. Of this sum £135,110, representing the depreciation written off to the date of sale, has been credited to profit and loss account. The balance of £224,804, being realised capital appreciation, has been credited to capital reserve. The resultant increase in the company's cash resources will be applied towards the cost of the new ships ordered.

Sales of Ships

Since the date of the balance sheet three more ships, the s.s. *London Craftsman*, the s.s. *London Mariner*, and the s.s. *London Vendor*, have been sold, realising an aggregate sum considerably in excess of the book values of those ships at March 31, 1951. The latter two ships will not be delivered to the purchasers until the end of 1951 and the trading profits up to that date will accrue to the company. Additionally, the company has purchased and resold the s.s. *Mill Hill*. This ship was owned by the Mill Hill Steamship Co., Ltd., in which your company holds £5,993 £1 shares out of a total issued capital of £20,000. The Mill Hill Steamship Co., Ltd., will be put into members' voluntary liquidation. Thus the transaction will result in the conversion of an investment, standing in the company's books at par, into cash considerably in excess of that figure. The effect of the transactions dealt with in this paragraph will, of course, be reflected in the accounts of the current year.

Since the last annual general meeting the company has been converted into a public company and its shares are now quoted on the Stock Exchange, London. This step was taken by your directors after the most earnest consideration, and they are encouraged and fortified in their task of bringing to fruition the company's ambitious building programme by the confidence displayed by members of the public which has been evidenced by their desire to secure a stake in the business. In thus making it possible for any member of the public to become a shareholder, the board held out no promise of high rewards, but stated their intention to propose a dividend of 5 per cent (less tax) for the year ending March 31, 1951, and to limit dividend payments on the shares of the company to that rate for the succeeding three years. This self-imposed dividend limitation and the resultant "ploughing back" of profits will play a substantial part in financing the building programme.

New Tankers in Service

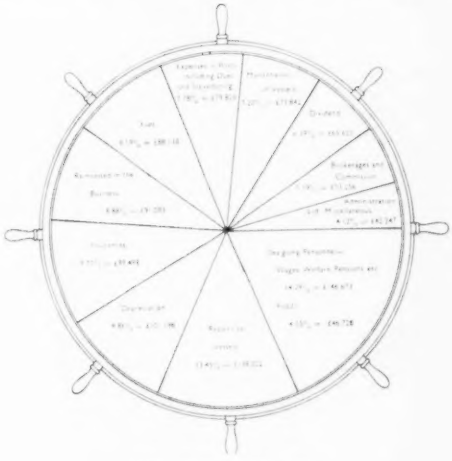
During the year under review the first two new tankers, the m.t. *London Pride* and the m.t. *London Enterprise*, came into service, and their performance has been highly satisfactory. The *London Victory* was launched last month, the *London Glory* 10 days ago, and it is anticipated that they will commence to trade during the last quarter of the current financial year. In addition, three vessels are far advanced in construction and will be launched within the same period.

The accounts for the year ended March 31, 1951, show a profit which comes up to expectations. The full benefit of increased freights is not reflected in the results by reason of unexpired charters at low rates extending well into the period. The company will pay no income tax or profits tax this year as a result of the incidence of initial allowances on new buildings, but the directors have thought it advisable to build up a reserve for future taxation to provide a cushion in years to come when the taxation liabilities will be increased by the exhaustion of capital allowances available for set-off against profits. Accordingly the sum of £150,000 has been set aside for this purpose out of available surplus at March 31, 1951.

In one respect your company is particularly fortunate in being a new one. The ships which are, or are to become, its fixed assets, are being built at today's prices. Thus the depreciation charged in the accounts is computed on a realistic basis, and the problem of bridging the gap between "historical cost" and "replacement cost" is happily not one which looms large on our horizon at the present time.

Future Prospects

It would be imprudent for me to look into the future and to draw conclusions or make forecasts, but I reiterate my faith in the future of British shipping generally and in the prospects for independent tanker-owning concerns in particular. Shipowners today are compelled to look many years ahead in planning development. A dynamic view and not a static one must be taken, if only because a new ship has to be ordered five or six years in advance. In pursuance of such a policy the board have, during the current financial year, ordered three more 24,750 d.w.t. steam-



Where the money went

This pictorial representation was issued with the report and accounts of London & Overseas Freighters, Ltd. It shows how the total income of £1,026,133 was expended during the year

turbine tankers. At the present time, therefore, the company's building programme, including the m.t. *London Pride* and m.t. *London Enterprise* already in service, embraces a total deadweight tonnage of 310,000. The capital commitments involved are of the order of £12,750,000, of which a little over £3,000,000 has already been met. Your board has secured long-term employment for all the tankers on order at March this year on a basis designed to safeguard against the continued depreciation of sterling and the continued rise in operating costs. My colleagues and I consider ourselves fortunate in having secured the services of Mr. W. E. Loveridge in the capacity of technical director to the company. Mr. Loveridge's experience in the marine engine world is second to none and will prove invaluable.

The company's name and its ships are becoming widely known and a staff of efficient and experienced officers is being built up. To these men and to the administrative staffs we must look in a large measure for continued prosperity. I am confident we can count on them for their loyal service and take this opportunity of expressing our thanks for their contributions to the results of this year.

The report and accounts were adopted.

Egypt and Suez Canal Company

The Suez Canal Company has announced that, contrary to certain messages which have appeared in the Press, no differences have arisen between the Egyptian Government and the Suez Canal Company since the beginning of the present crisis marked by Egypt's abrogation of the 1936 Treaty. Indeed, the Egyptian Minister for Finance and Internal Affairs, H. E. Fouad Serag El Dino Pasha, has gone out of his way to acknowledge the propriety with which the company is performing the international public service for which it is responsible, as well as the punctiliousness with which it is fulfilling its obligations towards the Egyptian Government. Apart from the changes in the timetable and schedules of the convoys which have already been reported, all the company's services are being assured by its staff in the usual conditions. It should be emphasised that the strikes of personnel specialised in the mooring of vessels and the provision of the mobile projectors used by ships for night transit affect only personnel employed by shipping agents entirely independent of the Suez Canal Company.

Port of London Authority

During the year ended March 31 last there was a further increase in the net tonnage of shipping using the Port of London. The annual report of the Port of London Authority shows that during the year 54,313,846 tons net of merchant shipping arrived or departed from the port, compared with 50,248,551 tons in the previous year. This figure is 87.5 per cent of the 62,085,840 tons of shipping using the port during the year ended March 31, 1939. The tonnage of goods passing through the port has also shown a considerable improvement and exceeded the tonnage of goods imported and exported during the immediate prewar years. Imports and exports amounted 44,873,901 tons net, of which 35,998,911 tons consisted of imports. This compares with 41,662,063 tons in the year ending in 1939, of which 34,098,315 tons comprised imports. The total amount of goods in transit in 1950 was 10,740,968 tons. It is stated in the report that much progress was made during the year in the provision of additional accommodation both for goods and shipping. Most of the work was concentrated on the restoration and improvement of damaged property, but major schemes involving new work were put into operation at the India and Millwall Docks and at London Dock. Heavy expenditure was incurred in providing new cargo-handling equipment of many types. New methods of working cargo are being used, and some are still in the experimental stage. The demand for further equipment is likely to be a continuing problem while the supply position remains difficult. The work of the port has again been seriously delayed on several occasions during the year under review by unofficial strikes, which, in the main, were not connected in any way with conditions of employment. Capital expenditure during the year amounted to £960,862 and the year's working produced a total revenue of £11,153,281, and a total expenditure of £8,836,748. Dredging operations during the year entailed the lifting of 1,062,413 cu. yds. of material from the river and 1,890,496 cu. yds. from the docks.

Indian Port Problems

Development of Minor Ports

By a Special Correspondent

THE development of minor ports in India, at an estimated cost of Rs.25,000,000, has been recommended by Mr. S. Nanjundiah, of the Ministry of Transport, Government of India, in a report submitted to the Government. Mr. Nanjundiah was appointed last year to collect information relating to the traffic handled by minor ports and to make proposals regarding administrative machinery and other improvements necessary to ensure the fuller use of these ports.

Stressing the urgency of the problem of dredging in most of the ports, the report says that before any scheme of expansion of a port is undertaken, it is necessary that a hydrographic survey of the approaches to the port, and in some cases the anchorage, should be carried out. Two pools of dredgers, one in Madras and the other in Saurashtra, should be created for the needy minor ports to draw upon. The report also suggests the setting up of a central port organisation under the Ministry of Transport for purposes of coordination, exchange of information, technical personnel and plant and craft, and avoidance of duplication, wasteful competition and uneconomic construction.

The minor ports in India present an amazing variety in size and functions, the volume of traffic handled, financial position and administrative set-up. The facilities provided vary from nothing in some of the open roadstead ports on the seaboard, to five elaborate harbours with dredgers and equipment as in Saurashtra; from ports handling only a few hundred tons to as much as 500,000 tons per year; from ports with an income of only a few hundred rupees per year to those with an income range of Rs.600,000 to Rs.800,000 per year; from ports very well and efficiently administered to those "also run."

Provision for Ships Up to 3,000 Tons

With a few exceptions, practically all the minor ports are roadsteads and cargo has to be carried in lighters or country-boats from ship to shore or vice versa. Mr. Nanjundiah has recommended that some of them, like Chandbali, Kakinada, Tuticorin and Beypore could, at no great capital outlay, be converted into medium-sized ports capable of taking coastal ships of 3,000 tons. The main works involved would be the construction or alteration of suitable berths or jetties and measures necessary for maintaining the depths at a proper level.

As approximately 40 per cent of the trade of minor ports is carried by sailing vessels, every facility should be given for their upkeep, maintenance and repairs and laying-up during non-working seasons at as many ports as possible. In particular, the ports of Kakinda, Cuddalore, Tuticorin, Beypore, Mangalore, Karwar, Bhavanagar, Verawal, Bedi, Navalakhi, Okha and Mandvi should take action to provide such facilities.

The report makes certain suggestions to improve the administration of minor ports within the framework of the present system of administration by the State Governments. The proposal that the Union Government should take over all the minor ports under its direct administrative control is not recommended. The report proposes the formation of a port trust as soon as possible to cover all the ports of the State of Travancore-Cochin. It also stresses that Okha, the finest of all minor ports in India, should be kept going at its present level of utility.

The report reveals a large diversity of import dues and charges levied from port to port, varying from 9 pies to 9 annas per ton. Though it may not be possible, nor necessary, to bring about a rigid uniformity in rates throughout India, the present wide variation, which in the past was due to competition and to differences in administrative conditions in the country, may be narrowed down. The creation of a pool of tugs and the purchase of additional tugs and launches are recommended.

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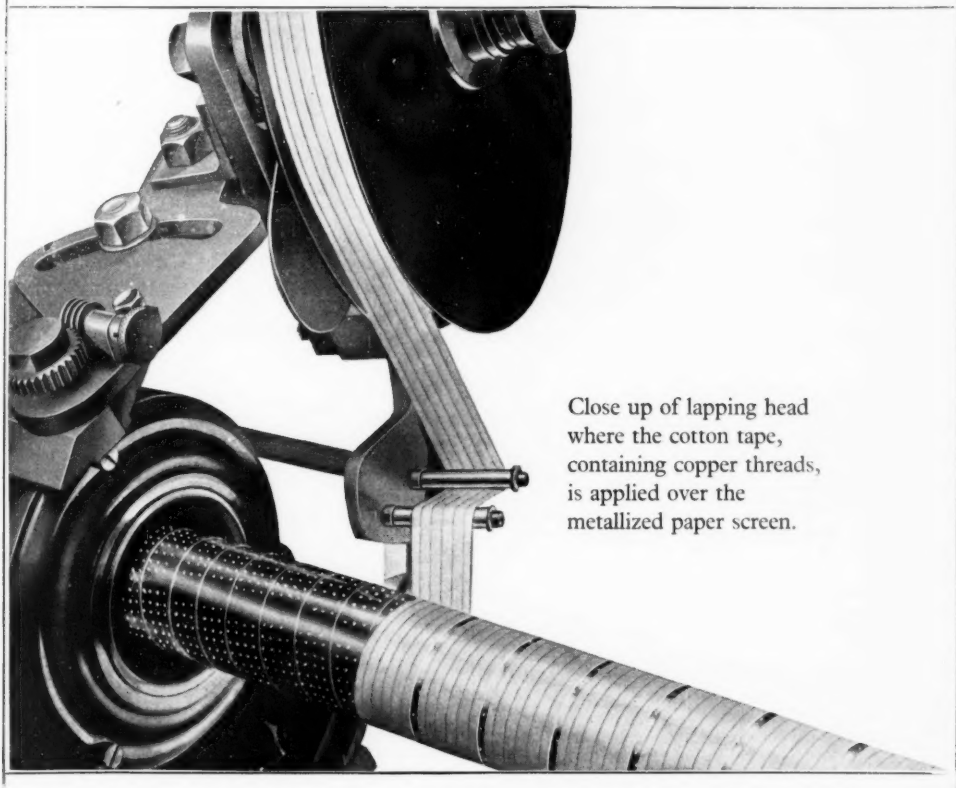

Close up of lapping head where the cotton tape, containing copper threads, is applied over the metallized paper screen.

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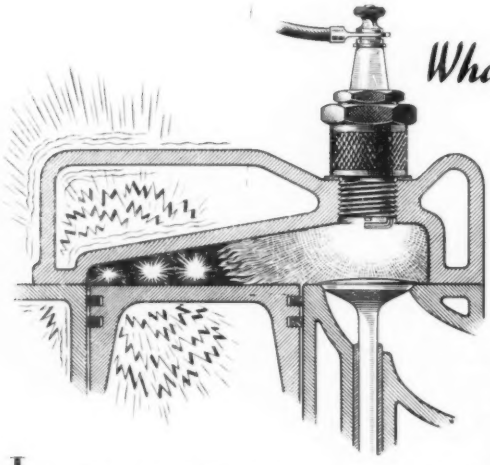
INTERESTING FACTS ABOUT OIL

No. 9.



What causes "engine knock"?

In the early days of motor cars any mixture of light 'straight-run' hydrocarbons derived from natural gas or crude oil would function satisfactorily as motor spirit, because petrol engines were designed with low compression ratios. Such fuels failed when the demand for higher efficiency had to be met by the use of increased compression ratios. Higher ratios raised the temperature of the compressed charge of air and fuel vapour. The combination of increased temperature of the mixture at the time of ignition and higher general and local temperatures of metal in the combustion chamber, due to speed increase, had a profound effect on the fuel between the time it entered the cylinder and the moment at which it was burnt.

Experimentalists found that higher compression engines caused rough running and more or less heavy explosions. These were thought at first to be pre-ignition caused by overheated portions of the engines igniting the mixture too early and before the spark occurred.

In fact, when the spark occurs and the flame begins to spread, the temperature and pressure of the still unburnt part of the mixture rises rapidly, leading to certain chemical changes. Their effect is to lower the degree of temperature at which the unburnt mixture will spontaneously ignite. This temperature is reached before the advancing flame has travelled through the combustion space, and the burning is therefore completed with great violence. An explosion takes place so suddenly that it gives, in effect, a hammer blow to the cylinder head and piston. This makes the metal 'ring', leading to the phenomenon known as pinking, or engine knock.

Anything which increases the time available for these chemical changes in the mixture, or which raises the temperature or pressure of the charge, will tend to produce this knock: it is most evident at slow speeds; it is much more liable to occur in large engines than in small ones when the compression pressures are the same; and it develops in any engine if the compression is too high.

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COAL AND OIL

SAVING COAL IN INDUSTRY

Perhaps the best hope for the resumption of coal exports on a worth while scale lies in the tremendous economies in industrial and domestic coal consumption that can be made with modern technique and equipment. Indeed, in many cases, marked savings have resulted merely from a proper attention being given to existing coal-fired plant. A useful shot in this battle for economy has been fired by the Federation of British Industries, which has produced a booklet entitled *Fuel Economy Pays*. The booklet shows how industry can avoid waste in the use of fuel and, at the same time, often make substantial economies in costs. Advice given is based on the experience of the Federation's fuel advisory service, which has been maintained for more than 25 years. In a foreword Sir Norman Kipping, director-general of the F.B.I., says that, while the F.B.I. will not relax the strenuous efforts it is making to ensure that industry obtains enough fuel and power, industry can do much to help itself by reducing waste. The booklet, which is divided into three main sections—common faults in boiler operation, the use of instruments for measurement and control, and the efficient use of heat—points to the main causes of waste in fuel and shows how such losses can be avoided. Many of the suggestions made can be carried out without large capital expenditure, and with a saving in fuel and cost which is often striking.

Reconditioning Lubricating Oil

The increasing cost in recent years of high grade lubricating oil suitable for marine diesel engines has led to more attention being given to the possibility of reconditioning these oils. It is the usual practice on board ship for the crankcase lubricating oil to be continuously passed through centrifugal separators and filters during voyages. After some time this process fails to extract the accumulation of fuel soot (collodial carbon), which is continuously building up, and the oil has to be ultimately discarded. Recently a well-known independent firm in Liverpool, which has been handling and treating oils for many years, has evolved a process by which treatment of contaminated oil can be carried out at a reasonable cost to the shipowner. The oil is delivered to the company, which processes it, removing all the collodial carbon, the fresh or salt water which may also be contained in the oil, and also any diesel fuel oil, which from time to time has been found in used oil. The average loss in bulk in decontamination amounts to about 25 per cent, and the time required to carry out the process is about seven to ten days. Results obtained by this process appear to show that the reconditioned oil compares very favourably with the original oil.

Oil Fuel on the Great Lakes

Oil-powered cargo vessels are gradually replacing coal burners on the Great Lakes. Of the 268 vessels on the Great Lakes, only a very small number used anything but coal until recently. But of 14 new Lake vessels now being built, only one will be a coal-burner. Four vessels have been converted from coal to oil during the past year, six oceangoing oil-burning ships are being converted for Lakes use, and more conversions to oil are expected soon. One company estimates that it costs 12s. 8d. per mile to run a vessel on oil, as against 12s. per mile on coal. But an extra three knots are obtained on oil and there is a big saving in labour costs in fuelling. The Pittsburgh Steamship Co., a subsidiary of the United States Steel Corporation, has converted two coal-burners to oil. An oil-fired steam turbine has been installed in one of the ships, while a diesel engine has been fitted in the other. Details of the performances of the two ships are being carefully noted this season and next, and will be compared to determine which is the more efficient. A difficulty is the small number of oil fuelling stations on the Great Lakes. Until last year there were only three; three new ones have recently been added. Coal-burning ships can still bunker far more easily and it is doubtful whether more fuelling stations will be built quickly.

Shorter Items

Coal shipments from the Hartlepools during September were 184,966 tons, making a total for the first nine months of the year of 1,484,735 tons. This is 76,192 tons less than last year.

During the first nine months of this year, coal shipments from the River Wear amounted to 2,261,133 tons, an increase of 12,436 tons on last year. Coastwise shipments were up 233,271 tons, but foreign shipments were down by 220,835 tons. The biggest imports were 134,989 tons of iron ore and 124,958 tons of petroleum.

Claimed to be the most modern of its kind in Europe, a plant for the manufacture of "Teepol" is now operating at Petit-Couronne (near Rouen), France, with a designed capacity of 25,000 tons per annum. Adjoining the existing Shell Refinery, the new plant represents the first fruits of an association between Shell and the French chemical group, Saint-Gobain. A combined manufacturing company, named Société Shell Saint-Gobain, has been set up. Several years' experience in operating the similar British and Dutch "Teepol" plants—at Stanlow (Cheshire) and Pernis (near Rotterdam) respectively—has been incorporated at Petit-Couronne, and special feedstock (a cracked petroleum wax) is derived from Shell refineries. A feature of the new plant is the high degree of automatic operation, which enables a staff of only 70 to run a highly technical installation.

OFFICIAL NOTICE

Increase of Capital

Cory Brothers & Co., Ltd., shipbrokers, etc., Cory's Buildings, Cardiff. Increased by £2,000,000, in £1 ordinary shares, beyond the registered capital of £1,000,000. Part of the increase is for the purpose of acquiring the whole of the issued share capital of Gueret, Llewellyn & Merrett, Ltd., from Powell Duffryn, Ltd. The capital has been reorganised and is now £3,000,000 in £1 ordinary shares.

RECENT SHIP SALES

Norwegian single-deck steamer *Iron Baron* (3,313 t.g.), about 5,500 tons d.w., owned by E. B. Aaby's Rederi A/S, sold to Panamanian buyers for about £135,000. Originally named *Kilbaha* and later *Emerald Wings*, she was built by Russell & Co., Port Glasgow, in 1911, and her triple-expansion engines were built by the Clyde Shipbuilding & Engineering Co.

Cargo steamer *Olavus* (1,294 t.g.), owned at Malta by Paul M. Laferla, and built by C. Rennoldson & Co., South Shields, in 1920, with triple-expansion engines built by the Shields Engine Co., Ltd., sold to British buyers for £62,500. She is understood to have a deadweight capacity of about 1,960 tons and to have a speed of 9½ to 10 knots.

South American Saint Line, Ltd., has sold the cargo steamer *St. Cleavs* (4,308 t.g.) to German buyers for a price believed to be about £350,000. Built by J. L. Thompson & Sons, Ltd., Sunderland, in 1936, with compound reciprocating engines, with an L.P. turbine, by White's Marine Engineering Co., Ltd., she has a capacity of about 7,900 tons d.w. and a speed of nearly 10 knots.

Norwegian cargo steamer *Bauta* (1,661 t.g.), originally a Canadian sealer and built by the Nova Scotia Steel & Coal Co., Ltd., with triple-expansion engines by the Robb Engineering Works, has been sold by Mr. W. Hansen, of Bergen, to Swedish buyers for about £100,000. She carries about 2,700 tons d.w.

ROUND THE SHIPYARDS

The Situation in Scotland

By THE SHIPPING WORLD'S Own Correspondent

The dominant factor in Scottish shipbuilding remains the scarcity of steel. There is no lack of business, since the past month has seen the flow of new orders, now expected, continuing to come in. There is undoubtedly a danger that this intake of fresh business may be taken for granted in view of its regularity so far; the leading executives certainly do not take such a view, but have rather warned consistently against undue complacency.

Lord Rotherwick, chairman of The Clan Line Steamers, Ltd., and Dr. J. M. McNeill, managing director of John Brown & Co., Ltd., touched on some of the problems at the launch of the *Clan MacIntyre*. There is no question of ploughing back profits today, Lord Rotherwick said. They were lucky indeed in that they kept their heads above water. It was only a question of time before all mercantile fleets would be so seriously diminished as to impair the efficiency of the industry. Dr. McNeill, too, endorsed this plea for tax adjustment. The restoration of initial allowances was a vital need.

These views are typical of Clydeside comment on present conditions. The surprising aspect of the situation has been the amount of British tonnage booked in spite of these adverse conditions. Among the new bookings are three 8,800-tons gross cargo liners for the British India Steam Navigation Co., Ltd.; these were mooted earlier, but no firm orders were indicated. It is now known that two are to be built by Barclay, Curle and the third by Scotts', of Greenock.

Burntisland is to build a 10,000-tons cargo motorship for the Alvion S.S. Corporation of Panama. Blythswood is also building for these owners, in this case an 18,500-tons tanker, and they were also in the news last month with a 32,000-tons tanker ordered from John Brown & Co., Ltd. Charles Connell & Co. is to build a 10,000-tons cargo vessel for Wilh. Wilhelmsen, of Oslo, and George Brown & Co. (Marine) Ltd., a 4,000-tons tanker for Bergen owners. This business is indicative of the continued confidence of Norwegian owners in Scottish yards, and forms evidence that Scottish prices remain competitive in world markets. These orders, booked within a few days of the end of October, indicate the steady trend of new business. October was also important for launchings, a considerable amount of tonnage being cleared. Trials have been run steadily, too, throughout the month.

The level of activity, however, is largely controlled by the flow of steel. Current estimates say that deliveries are at about 80 per cent of the required rates, and this must inevitably reflect in the early future on the rate of completions. The recent election has created a vacuum for the moment insofar as the control of steel plants is concerned; even were steelworks to return to private hands, however, the problem of scrap would still overshadow the future. One useful addition to Scottish sources of scrap is the 19,000-tons Brazilian battleship *Sao Paulo*, built on the Tyne in 1910, which is expected to be broken up on the Clyde. If this is so the scrap from this source would go largely to Lanarkshire plants, which have been suffering recently from a scrap shortage.

There have been some unfortunate stoppages by key workers this past month—unfortunate, in that they have hampered other tradesmen willing to work. It is still a regrettable fact that union officials are unable to prevent such stoppages, although adequate machinery exists to ventilate grievances. The fact that sudden stoppages can and do happen suggests that there is still scope for unions to tighten up their administrative organisation, and to improve their rank and file contacts to the point where stoppages are caught before they happen, in the interests of the workers as much as of the yards. Experience shows that no one benefits by these stoppages—especially in these days when no vital principles are involved.

SHIPBUILDING EMPLOYERS' FEDERATION—NEW OFFICE BEARERS

Mr. Robert Cousland
(Chairman of the Conference and Works Board)

Mr. A. Lewis Cochrane
(The new president)

Mr. Charles A. Winn
(Third vice-president)

At the annual general meeting of the Shipbuilding Employers' Federation, held in Edinburgh on November 8, Mr. A. Lewis Cochrane (chairman and managing director of Cochrane & Sons, Ltd., Selby) was elected president for the coming year in succession to Mr. Charles Connell. Mr. John G. Stephen (a director of Alexander Stephen & Sons, Ltd., Glasgow) becomes senior vice-president, and Mr. T. Eustace Smith (joint managing director of Smith's Dock Co., Ltd., North Shields) and Mr. Charles A. Winn (joint managing director of C. H. Bailey, Ltd., Cardiff) were also appointed vice-presidents. Mr. Robert Cousland (shipbuilding manager of J. Samuel White & Co., Ltd., Cowes) was elected chairman of the Conference and Works Board, and Mr. Hugh H. Hagan (director of Lobnitz & Co., Ltd., Renfrew) was appointed vice-chairman

Monthly Air Transport Section

AIR SAFETY

MODERN TRENDS IN CIVIL AIRWORTHINESS REQUIREMENTS

By E. N. B. BENTLEY

As Chief Technical Officer of the Air Registration Board, Mr. Walter Tye has probably more to do with our airworthiness requirements than any other man in the United Kingdom. His recent lecture on the subject,* before the Royal Aeronautical Society, is therefore of interest to all who design and use civil aircraft. He dealt with the subject in three phases: (1) airworthiness in relation to safety; (2) trends in airworthiness; (3) "crashworthiness." People have criticised the word "crashworthiness," on the grounds that it is ugly and does not mean what it says, but have not suggested a better one. Whatever the word used, the ability to withstand a crash with the minimum of casualties is an essential part of present-day airworthiness requirements which has, I think, no parallel in other forms of transport.

Statistics, in the form of passenger fatalities per hundred million passenger miles, show that on the U.S.A. scheduled services there was a fairly rapid decline from 1937 to about 1942 and thereafter an almost constant rate of two fatalities per 100,000,000 passenger miles. The British figures are about three times those of the U.S.A., but are still showing a steep decline, so that there is good hope of their eventually reaching the American level. Accidents per million aircraft miles again show the U.S.A. with a rapid drop in the early years and an almost stable rate by 1949. British figures again show as about three times those of the U.S.A., but still with a more rapid downward trend.

Accident Causes

With regard to causes of accidents, rather more than half of those in the U.S.A. in the years 1947-49 are attributed to personnel (mainly as pilot's error), just under 30 per cent due to lack of airworthiness and the remainder as miscellaneous, including weather. On the other hand, two-thirds of the British accidents are attributed to personnel and less than 10 per cent to lack of airworthiness. Such figures, as with most statistics, can give an erroneous impression unless one knows a lot about the conditions on which they are based. However, the big difference between "airworthiness" causes in the two countries can at least be taken to indicate the high standard of our aircraft in this particular respect. I am in full agreement with Mr. Tye when he questions whether all the accidents attributed to "pilot's error" can wholly be put down to human failure. The pilot nowadays is being asked to control a much more complex vehicle and to operate it in more severe weather conditions. A greater knowledge of psychology, physiology and anthropology on the part of the aeronautical engineer might result in much safer aeroplanes.

In considering trends in airworthiness, Mr. Tye makes a statement which, though well known and agreed in the aircraft industry, is not so well appreciated outside it. "It is nothing short of a technical miracle that such a complex mechanism as an aeroplane, operating in so unfavourable a medium as air, can be made not only to fly but to bear some resemblance to a routine form of transport." He also points out that the sheer fact of relying on the movement of the vehicle to support itself, infinitely increases the need for reliability. It is significant that modern performance requirements for transports are based on the concept that at least one engine is inoperative. Because of the increase in stalling speeds by 50 to 100 per cent of their prewar value, any forced landing is potentially more dangerous and therefore the ability to keep flying, with one engine out of action, is demanded.

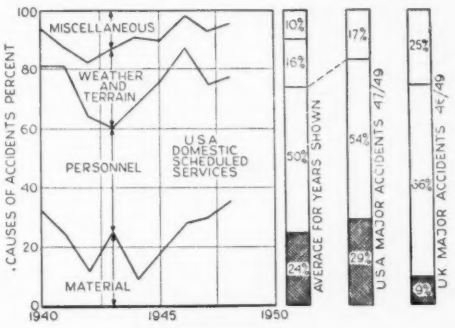


Fig. 2. Distribution of accident causes

The airworthiness authority has always been faced with a broad choice, to prohibit development, or to permit it, meeting potential dangers as they arise. Apart from one brief attempt by the U.S.A. to restrict stalling speeds, the lecturer said that he knew of no case where airworthiness authorities have followed the former course. On this point I disagree with Mr. Tye, for reasons which I will make clear later. Strength requirements have developed mainly in the direction of a more precise estimate of the loads which can be imposed, thus leading to relatively lighter structures with no reduction in the margin of safety. A fact which the lecturer did not mention is that these more precise methods involve the design offices in an enormously increased amount of work, compared with prewar days. Any further rationalising of strength requirements will have to wait until we have increased our knowledge, particularly of the impact of gusts at high altitudes.

A great deal was said about performance requirements, particularly as regards the ability to climb away at take-off or keep flying at altitude, if one engine stops. The flight trials necessary to prove compliance with these and other airworthiness requirements may involve hundreds of hours of test flying. After these numerous graphs have to be drawn, which show the operator the effect of differences in temperature and

* *Modern Trends in Civil Airworthiness Requirements*, read before the Royal Aeronautical Society on October 18, 1951.

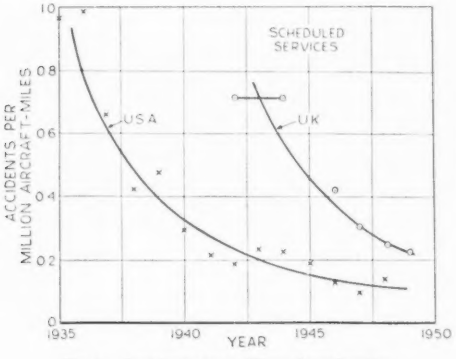


Fig. 1. Accidents per million aircraft-miles

altitude on the performance of the aeroplane. From these the captain can determine the maximum safe weight at which he can take off from a given length of runway, for any particular combination of temperature and altitude. In addition to this, any aeroplane seeking certification for operating in the tropics has to go to Khartoum, for example, for additional flight trials. It follows that any appreciable error in performance estimates or any increase in aircraft weight above that predicted, can have serious consequences and involve much loss of payload or modification to the aircraft. It is not surprising, therefore, that the period between the first flight of an aeroplane and its being granted a full normal certificate of airworthiness for carrying paying passengers amounts to at least a year and sometimes considerably more.

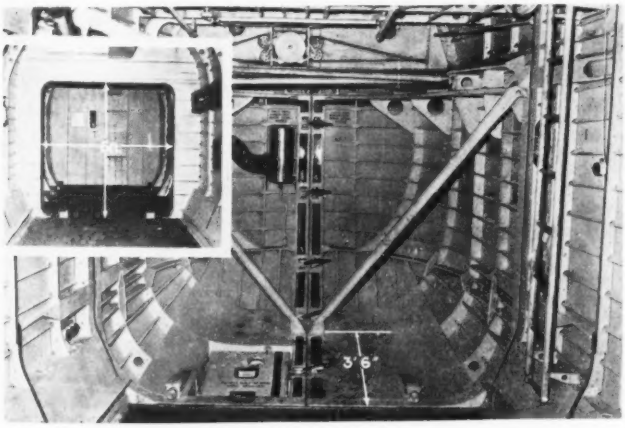
On the subject of crashworthiness Mr. Tye had a good deal to say and the importance of this subject he indicated clearly by the statement that "it is likely that for a given expenditure of weight, improved crashworthiness provisions will save more lives than would improved airworthiness provisions." Statistics of accidents occurring at or near the stalling speed of the aeroplane show that the number of fatalities in the aeroplane is about 25 per cent of the total occupants, for aeroplanes with stalling speeds of 70 to 80 m.p.h.; but for the aeroplanes with higher stalling speeds the fatality ratio was 50 per cent. If the trend of stalling speeds to increase is unchecked, then it seems likely that the fatality ratios may increase to 50 per cent and 80 per cent respectively. Worthwhile gains in safety would be made if stalling speeds were kept down to 75 m.p.h. and a reduction to 50 m.p.h. might bring the impact risks virtually to zero.

Calculations show that an aeroplane brought to rest in its own length, from its touchdown speed at landing, is subjected to about 6g deceleration. Since an acceleration, or deceleration, of 1g is a rate of change of 32 feet per second, every second, even 6g is quite fierce. Aircraft brought to a halt in only one-third of their length achieve about 20g; and this holds good for a range of aircraft from the 8,500-lb. Dove to the 140,000-lb. Stratocruiser. Even in a head-on collision with an obstacle at touchdown speed, in which the front third of the fuselage was smashed, the occupants in the rear two-thirds would be subject to no more than about 20g. A backward facing seat, high enough to support the head, will enable a passenger to survive 20g deceleration in the horizontal direction without any injury and with only temporary discomfort. The seat attachments and local floor structure must also, of course, be able to withstand the same forces. The lecturer estimated that the increase in weight of a seat to withstand 20g, as compared with the existing 6g seat, is 15 lb. per seat. However, I know of one aircraft constructor who has designed seats for 25g, for an increase of about 8 lb.

Complete elimination of the fire risk in a crash is not possible, but flexible bag tanks of heavier construction (again a weight penalty) would help. Tanks at the wing tips, instead of close to the engines and cabin, would also reduce the fire risk. It is estimated that

BRISTOL FREIGHTERS FOR CANADIAN ROYAL AIR FORCE

The Bristol Freighter aircraft, often referred to as the "tramp of the air," has achieved worldwide recognition as a versatile and cheaply-operated aircraft. An indication of its versatility is shown in the order placed with the Bristol Aircraft Co., Ltd., by the Canadian Government for a number of Freighters for service with the Royal Canadian Air Force. Freighter aircraft are already in service with the Royal Pakistan, Royal Australian and Royal New Zealand Air Forces. The aircraft in the new order will be of the latest type, complying fully with the new British Civil Airworthiness Requirements. New features included in this type, the Mark 31, are the installation of Hercules 734 engines, giving increased take-off power, an automatic propeller pitch device which gives increased safety at take-off, and strengthened main wheel undercarriage. Other new features include a dorsal fin and tailplane of larger span, providing increased stability, and the repositioning of the nose door support tubes and widening of rear bulkhead to six feet, thereby enlarging the main hold by 3 ft. 10 in. at floor level. A greater fuel capacity will increase the still air range to 1,650 miles. The picture on the left shows a view of the main cargo hold in the Mark 31 Freighter, illustrating the increased effective length of the cargo space, while above is a head-on view of one of the aircraft, showing the twin oil coolers in the leading edge of the wing



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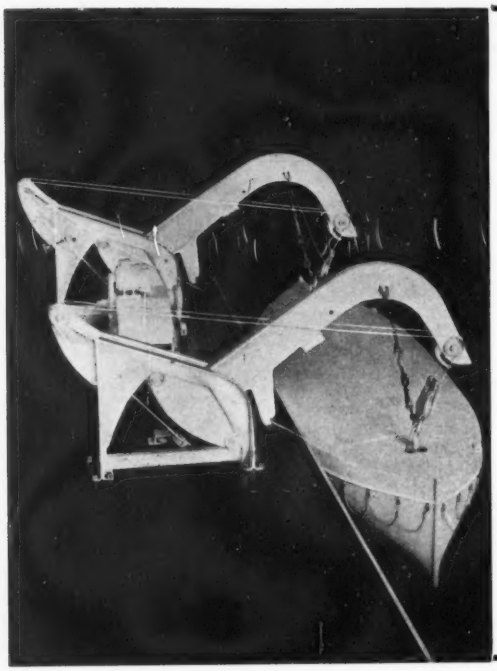

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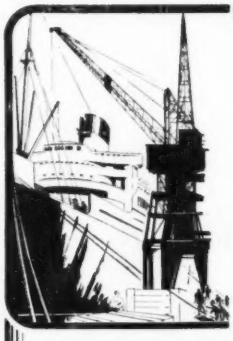

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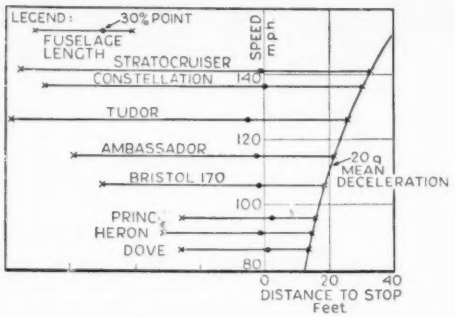


Fig. 3. Distance to stop in crashes at approach speed

elimination of fire in a crash would save about one-third of the people who would otherwise be killed; improved cabin arrangements, leaving the fire risk unaltered, would save about one-quarter of the lives; and both improvements together would save something between one-half and two-thirds of the lives.

In opening the discussion, Dr. Roxbee Cox, Chief Scientist to the Ministry of Fuel and Power, asked why there were more accidents on British airlines than on those of the United States. Did our climate have anything to do with it? But Mr. Tye was unable to confirm whether this was a contributory cause. Mr. Hardingham, Chief Executive of the Air Registration Board, probably shook the complacency of some of the audience regarding the low proportion of British accidents attributed to lack of airworthiness. He pointed out that British airlines were using a large proportion of well-tried American aircraft which had been developed and proven before we started to put them into service. It was largely the development and trials in service of their new types which gave a higher proportion of accidents due to lack of airworthiness. He also pointed out that we, in turn, were about to put to the test our new generation of civil aircraft. He said that designers were cooperating well on improving crashworthiness, except in the matter of backward facing seats. It was time to stop talking and get something done.

Rearward Facing Seats

Mr. H. H. Gardner, of Vickers, Ltd., said that the industry was quite prepared to provide rearward facing seats, if the customer asked for them and was prepared to pay the cost. Mr. Peter Masefield, Chief Executive of British European Airways Corporation, said that he was not against rearward facing seats, but a full investigation into the subject had shown that its advantages under all conditions was by no means conclusively proved.

This lecture and the ensuing discussion undoubtedly provides much food for thought for designers and operators, not to mention the passenger, whom they are both there to serve. It showed clearly the complicated and interwoven nature of all the subjects which together make up the airworthiness characteristics of an aeroplane. The emphasis on crashworthiness is an admission of failure to achieve complete airworthiness; but complete safety is impossible of achievement in any form of transport. However, there is no doubt that, on any reasonable basis, air transport is more dangerous than other forms, and every effort must be made to improve its accident record. If it has not already been done, then a searching investigation into the reasons for the much better record of the American air transport industry is imperative.

It is surprising that, in spite of the new generation of British transport aircraft now coming along, the only customer who has asked for rearward facing 25g seats is the Royal Air Force. I consider that the Air Registration Board missed the chance of a considerable improvement in crashworthiness when, in the 1951 airworthiness requirements, it merely recommended, and did not insist on, rear facing seats capable of standing a high deceleration.

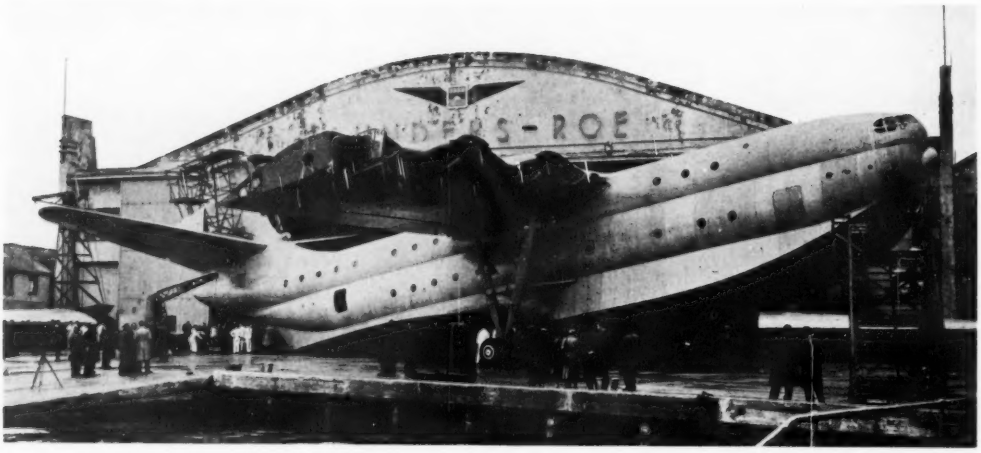
On the subject of stalling speeds, Mr. Tye seemed to be inconsistent. After showing the great increase in safety which could be achieved by a reduction in stalling speed, he implied that the only time when the airworthiness regulations had tended to restrict progress was when the U.S.A. suggested a limitation in stalling speed. I believe, and the evidence given in the lecture supports my contention, that the biggest single contribution to safety would be a moderate stalling speed. After all, it is not very clever to increase the cruising speed of aircraft by 50 per cent, if the stalling speed also goes up in the same proportion. If a low stalling speed had been insisted on, manufacturers would have been forced to develop slots, flaps, variable incidence wings, and so on, in order to achieve a safe and reasonable stalling speed without unduly sacrificing cruising speed. This would also result, as Sir Frederick Handley Page has shown, in an enormous reduction in aerodrome costs, due to the much shorter runways required.

The fact is that the public could be given an enormously increased degree of safety by the simple expedient of reducing stalling speeds down to 60 or even 50 m.p.h., at the sacrifice of cruising speed and range. The probability is that, having got used to aeroplanes which cannot be kept under full control at less than 100 m.p.h., and the accidents inevitably associated with such aircraft, they regard a reduction in speed, with its associated increase in safety, as a retrograde step.

A NEW airline, Air Viet-Nam, has replaced Air France on the Indo-Chinese air routes. The new company has been organised by the French and Viet-Namese Governments.

Propellers for the "Princess"

De Havilland propellers are to be fitted to the Princess flying boat, now completing by Saunders-Roe, Ltd. Of the hollow steel blade type, with a diameter of 16 ft. 6 in., a propeller is shown here fitted to a Bristol Centaurus 630 engine of an Airspeed Ambassador. On the Princess, Bristol Proteus turbine units will be installed. A single Proteus power unit is to be employed in the outboard positions, while in the inboard positions there are to be fitted double turbines driving counter-rotating de Havilland propellers. The power developed by the coupled units will total 6,700 s.h.p.



THE SAUNDERS-ROE "PRINCESS"

PROGRESS ON THREE BRITISH GIANT FLYING BOATS

By "ALBATROSS"

WHEN I first visited the Saunders-Roe works at East Cowes in the Isle of Wight in January 1948, the three big flying boats, then known as the Type SR/45, were under construction, surrounded by scaffolding and platforms. Already a specimen section of the hull had been built and fully tested for pressure tightness, corresponding to more than twice that encountered when flying at 40,000 ft. altitude. A full size wooden mock-up of the hull, with cabin partitions, seats, bunks, and so on, had been built to ensure that the flight deck and cabin accommodation were satisfactory. By the summer of 1949 the first hull was almost complete and was moved on its cradle to the centre of the assembly shop for attachment of the wing centre section and tail unit.

On October 30 last the completed hull, with sound-proofing installed, and with inner wings, tailplane and fin attached, was towed from the assembly shop on its beaching chassis. This is a temporary and detachable undercarriage with four-wheel bogies fixed to the main wing struts and a twin-wheeled bogie attached to the bows. Characteristic of the planning and forethought entailed in the construction of this huge aircraft was the building of a 1/6-scale model of this chassis, which was tested in the tank to ensure that it floated at the right depth and attitude for easy attachment to the wings and hull.

Accommodation for 200 Troops

The 148-ft. hull, with its inner wings and 77-ft. span tailplane, was swung round and manœuvred past the two other hulls under construction, into the open space between the assembly shop and the slipway. Alongside were the two outer wings, almost completed and with the wing tip floats attached. A scaffolding was already mounted on the tailplane, round the fin, ready for attachment of the top seven feet, for which there was insufficient height inside the shop. One of the twin Bristol Proteus propeller-turbine power units and one single unit, were also on view, together with one pair of the 16-ft. propellers. When the outer wings are attached and the top portions of the fin and rudder added, the complete boat will have a span of 220 ft. and a height of 56 ft. The double decker hull, 24 ft. 3 in. high and with a beam of 16 ft. 8 in., has a total cubic capacity equivalent to that of three Constellations at present in service on the Atlantic route. Designed originally for luxurious accommodation of more than a hundred passengers, now that the Princess is to be used by Transport Command of the R.A.F. it will be arranged to carry 200 troops with all their equipment.

From talks with some of the design staff of Saunders-Roe it seems that they are confident of flying the Princess next summer, provided that the engines are available. The flight trial programme, which is naturally a lengthy one of many stages, has already been drawn up.

B.O.A.C. Finances

In the first half of its current financial year (April/September inclusive) the British Overseas Airways Corporation made an operating profit of £974,000, which, after allowing £481,000 for interest on capital, etc., left a clear surplus of £133,000. This compared with deficits of £2,228,000 and £4,018,000 in the corresponding period last year and the year before respectively. The Corporation's volume of traffic during August and September was maintained at a high level and load factors of 64.8 per cent and 70.4 per cent respectively were achieved in these two months. In September revenue exceeded £3 mn. in a single month for the first time—by far the best traffic month the Corporation has experienced. The chairman, Sir Miles Thomas, said that efficiency has continued to improve and costs to be reduced, despite the rise in world costs, and he announced that a new basis of agreements on mail rates had been reached with the British Postmaster General. The rate received for mail originating in Britain would in future average 14s. 2d. instead of 11s. 1d. per ton mile.

Shipping and Airlines Cooperate

Shipping lines and airlines, once keen competitors for passenger traffic, are finding that close cooperation instead of rivalry brings better business for both, according to the *Wall Street Journal*. The usual arrangement enables a passenger to make an outward journey by sea and the return trip by air, or vice versa, on a single ticket at a reduced fare. The latest such agreement announced in New York is between Farrell Lines and K.L.M. Royal Dutch Airlines, offering travellers between the United States and Africa a choice of flying one way and sailing one way at a 10 per cent return fare reduction.

MARINE DEVELOPMENTS IN ALUMINIUM—II

WORKING OF ALLOYS IN THE SHIPYARDS*

By J. VENUS (Naval Architect to the Aluminium Development Association)

OWING to the need to differentiate between heat-treatable and non-heat-treatable material, it has been decided to introduce a system of marking to be used for shipbuilding material, but only where British Standard numbers are specified. This will assist in segregating the basic types and thus avoid confusion.

Forming. The alloys NP.5/6 and NE.6, which do not depend upon heat treatment to achieve their mechanical properties, can be heated without any appreciable drop in strength and, in addition, they can be cold-worked more easily than H.10 and at least as easily as cold steel. Where heating is necessary this should preferably be controlled heating and the top permissible range is about 400 deg. C. H.10-WP, the heat-trouble alloy is the most difficult to form. It must not be heated or the strength will be reduced and it is rather more difficult to form cold than N.5/6 or N.6. If used in section form in conjunction with lapped plates it is advisable to use lazy joggles or liners. Nevertheless, because of its relatively high strength and the fact that it is slightly cheaper than NP.5/6 or N.6, it is a useful material, particularly for sections where the amount of forming required is not excessive.

For heating sections at least one shipyard has installed a thermostatically controlled electric furnace with good results and such a furnace is not difficult to build and it is much superior to flame heating. Where it is not practicable to have exact heat control, heating can be by means of a "soft" large gas flame, which should be kept constantly in motion to prevent local overheating. Heating should be done for some considerable time before beginning to bend and temperatures can be checked either by special crayons which change colour at certain temperatures or by rubbing a pine stick over the heated metal surface. When this leaves a brown char mark it indicates that the alloy is hot enough for working. Hand pyrometers are another useful means of checking temperatures and could be more widely employed. With proper heating and control frame bending can be accomplished as easily as on steel. When rolling plates or flanging, the rolls or forming tools should be brushed clean so that particles of steel or other metals are not embedded in the alloy. When bending sections on the frame bending slabs it is advisable to have flat palms to the holding-down "dogs" to prevent unsightly damage to the alloy surface, or insert pieces of aluminium sheet, and if hammers are faced with rawhide this also helps to prevent unsightly abrasions.

Cutting and Machining

Cutting and Machining. In general, shearing, punching, planing, etc., can be carried out as for steel. The same applies to drilling, but special drills and higher speeds are more efficient for aluminium. Where it is necessary to cut shapes or notches in plate this can be done by pneumatic tools but at least one very good routing cutter is on the market which does this work very neatly and quickly. For cutting heavy sections a high-speed cross-cut saw with a circular blade of special type for aluminium is very efficient. Special blades are also supplied for use in wood-cutting bandsaws and here it is advisabe to see that the blade is supported by backing rollers situated closely above and below the work being cut.

Flame Cutting. This is still in process of development for aluminium but there are two processes which show some promise. One is the powder cutting process wherein iron filings are introduced into an oxy-acetylene flame, and the other is an electric arc cutting process wherein oxygen is fed down the centre of a hollow steel electrode. At the moment the cuts are very rough but it is hoped that the technique will be improved in time and work is proceeding with this in view. The latter process appears to be useful for de-riveting and may have an application in repair work involving aluminium.

Riveting. The rivet material in common use for marine work is the 5 per cent aluminium-magnesium alloy NR.6, which has a strength in shear of about 11½-12 tons per sq. in.

In favourable conditions the cold driving of rivets by pneumatic riveting is possible up to ⅜ in. diam., 60 deg. countersunk points. Unless the point is formed within 25-30 sec. the hammer is too light, as after this time sufficient work hardening has taken place to prevent further closing, and continued driving then makes cracking of the edges a possibility. In general, therefore, in order to close the rivets fully and reduce driving time, a larger riveting gun than for the equivalent steel rivet should be used whenever possible. It is felt that a somewhat smaller countersunk depth than that laid down by Lloyd's Rules might be acceptable from the point of view of strength, and as this reduces the amount of material to be displaced by point formation, the process is eased considerably. Small points have now been developed, not only for countersunk but other point shapes such as small pan and a special recessed point.

Hot and Cold Riveting

Smaller clearances than for steel are desirable for cold riveting, for example 1/32 in. maximum for ⅜ in. diam. rivets, and this again makes driving easier as hole-filling time is thereby reduced. It is advisable to have a very slight countersink under the rivet head, say only 1/16 in., to prevent "nicking" under the head, and if the rivets used can be about ⅛ in. over normal length this gives a raised hammered point in association with the countersink and helps to prevent the damage to the plate by the riveting hammer, which sometimes occurs with flush countersunk points.

For hot riveting the permissible heating temperature is between 400-500 deg. C., but a thermostatically controlled electric heating furnace is recommended. This can be constructed with an electric element heating a block of pure aluminium drilled out to hold the rivets. It can be enclosed in a steel box on a stand and the solid block retains sufficient heat to ensure uniform heating of the rivets. When hot rivets are taken out of the furnace they are very malleable but after the first few seconds' driving the hole is completely filled and then the temperature falls very rapidly owing to the very high conductivity of the aluminium plate now completely in contact with the rivet; immediately after driving is completed the point is only warm to the touch. In addition, of course, the working temperatures are much lower than for steel. It can be concluded from this that while heating of aluminium rivets is helpful in assisting hole filling, and thus may permit larger clearances, it does not materially help in point forming. Heating makes possible the driving of countersunk rivets up to ⅝ in. diam., but when sizes above this become necessary it will be more difficult. A suggested means of overcoming this difficulty is to consider the possibilities of heating the rivet *in situ* in order to maintain the rivet temperature until driving is completed.

Methods of Welding

Welding Aluminium. The processes for structural work of most interest to the shipbuilder are metallic arc welding using coated electrodes and the shielded arc processes, where an argon gas shield is used to prevent oxidation of the metal during welding. With coated electrodes the flux coating is invariably corrosive and the joint must be free of all flux. This is possible in V joints with downhand welding but is more difficult to achieve in right-angle joints. After welding, all welds must be thoroughly cleaned of flux, using hot water. Moreover, the strength of welds produced by metallic arc welding is not nearly so high as can be achieved with the argon arc process. One of the problems in all types of welding is porosity, but this may be largely overcome by using plate and welding wire with a low gas content, and a good welding technique.

In the argon arc method of welding the arc is struck by a tungsten electrode shielded in an inert gas such as argon, and the filler wire is usually fed in by hand, no flux being used. The downhand technique, using two operators working away from the centre of the welded seam, appears to be most efficient in producing good welds and in reducing distortion of the plates. The equipment for argon arc welding is fairly complicated and entails a special H.F. unit and water cooling of the hand torch. The process is applicable to plates up to ¾-1 in. in thickness.

A very promising process and one likely to be of more interest to shipbuilders is an American process known as "Aircomatic" welding. Again, argon (in the U.S.A. helium or argon) is used to shield the weld and prevent oxidation

* Abstract of a paper read before the Institution of Engineers and Shipbuilders in Scotland on October 23. The first part of this paper appeared in last week's SHIPPING WORLD.

but the welding wire itself is used as the electrode and is fed automatically into the hand torch; there is no tungsten electrode. D.C. supply is used with a very high current density and the molten particles of weld metal are transmitted across the arc in the form of a spray of fine droplets instead of a molten bead of metal as in ordinary argon arc. This makes vertical and overhead welding possible and the welding speed is very much greater (about four to five times) than for ordinary argon arc. The overall consumption of gas is reduced to about one third and mainly because of the very rapid heat input distortion is reduced. With a proper adjustment of current and the rate of feed of the wire the arc acquires self-regulating properties which make the welding very easy. Where it is necessary to weld outdoors a canvas screen is rigged to prevent excessive draughts, although it is probably necessary to increase the flow of argon gas under these conditions. Ships' superstructures and the complete hulls of 95-ft. M.T.Bs have been welded in the United States by this process, and it is felt that the "Aircomatic" process will mean a very large advance in the progress of aluminium welding. At the moment there are no sets in commercial use in this country but there are many in use in the United States' shipyards and naval yards.

Availability of Equipment

As would be expected, better weld efficiencies are obtained in the non-heat-treatable alloys and welds can be produced having over 90 per cent of the tensile strength of the plate material and also showing good elongation figures. Although up to the present time only American equipment is obtainable, it is hoped that welding sets will soon become available to British yards but this might well depend upon the interest shown by the shipyards in this new process.

Where H.10 sections are used in conjunction with NP.5/6 plating, welding with 5 per cent aluminium-magnesium wire can be used for the joints and in this way the greater proof stress of the H.10 alloy is best utilised; the plate and weld, being nearer to the neutral axis of the girder, are not so highly stressed, and the section flange which is farthest from the neutral axis, is the point of highest stress and is of stronger (and cheaper) material.

Stud Welding. An efficient stud welding process has been developed and to date has been mainly used for welding studs to aluminium bulkheads for the attachment of insulation. Studs of $\frac{1}{2}$ in. diam. have been used experimentally for fastening down wood decks and the process seems perfectly feasible for commercial application. Best results are obtained with N.6 studs to NP.5/6 plating. The threads should be rolled for preference to give greater hardness, and H.10-WP nuts are suitable, again because of their greater hardness. To prevent binding, clearances should be ample and an anti-seize grease should be used. To guard against the danger of penetration of the plate the stud diameter should not be more than twice the plate thickness.

Prefabrication. Although the shielded arc processes are more suited to use under cover, the light weight of aluminium structures makes it possible to consider the prefabrication of units at least twice as large as for steel, with the same crane facilities. If welding develops, as seems likely, the shipbuilder can also design his sections for higher efficiency, as the extrusion process permits a wide choice of sections for relatively low initial cost of dies.

Metal-to-Metal Joints

Watertight Joints. Generally it can be said that metal-to-metal riveted joints, mechanically caulked, are preferable to using impregnated fabrics which may deteriorate with age and thus harbour moisture. Caulking is quite practicable but requires a lighter touch than for steel as the alloys are not so hard. Watertight rivet spacing is about the same as for steel-work and minimum edge distance should be $1\frac{1}{2}d$ + $\frac{1}{2}$ in. from centre of hole. The faying surfaces should be painted before the joint is made.

Bi-metallic Joints. Although the *Diana II* previously referred to illustrates the remarkable resistance of the aluminium-magnesium alloys to marine corrosive conditions, the problem is more serious where bi-metallic joints occur. When an electrolyte is present, aluminium usually suffers when in contact with steel, and almost invariably does when in contact with copper or copper-containing alloys. The first rule is to avoid such contacts but where this is not possible the following guiding principles should be followed.

When an aluminium deckhouse is fastened to a steel deck by a steel boundary angle, the joint should be raised clear of any wood deck or deck covering that may be fitted. The choice of steel or aluminium rivets will be dictated by the rule that rivet points or heads on the weather side of the joint should be of the same material as the plate with which they are in contact. All faying surfaces should be coated with barium chromate jointing compound or zinc chromate primer. Finally, it should be borne in mind that electrolytic corrosion will not begin while a good protective paint coating is present. Galvanising of the boundary angle is not necessarily a guarantee of protection and in any event galvanised rivets are of little use. If steel rivets are used in aluminium construction a much more effective method of protection is to spray the rivet points with aluminium after driving.

Wood/Aluminium Joints. When wood is in contact with aluminium, corrosion can occur either from acids, which are present in certain hard woods, or from the "poultice" effect of the timber, which can harbour increasing concentration of salts from the sea water as it dries out and becomes wet again. It is therefore desirable to use a bituminous compound between any wood/aluminium joints which are exposed to the weather. Wood decks should be bedded in bituminous paint and not red lead, and if aluminium bolts or studs are used the dowels should be bedded in zinc chromate or zinc oxide paste and not white lead.

Protection and Painting. Painting is usual and desirable, but paints containing lead compounds must not be used. Usual priming paints are zinc chromate or zinc oxide, but to secure good adhesion the metal surface must be carefully cleaned and prepared. This initial preparation is simplified by using self-etching primers and generally the advice of the paint manufacturers should be sought to ensure that finishing coats are compatible with the priming coat.

Anti-Fouling Paints. Special anti-fouling compounds based on organic poisons must be used and applied over suitable undercoats containing zinc or barium chromate. Compositions containing copper or mercury should not be used as they can promote rapid corrosion of the aluminium hull.

Deck Compositions. Deck compositions containing magnesium chloride should not be used as they can cause corrosion, but several proprietary compositions with no corrosive effect on aluminium are available.

Fuller information on the working of aluminium in the shipyard is shortly to be published.

Conclusions

Marine applications of aluminium alloys have expanded considerably during the postwar years and the future prospects are favourable. The experience of shipyards using considerable quantities of aluminium has shown that no special difficulties are encountered in working the material with normal shipyard machinery, although even better results are obtained by following the recommendations given for working of aluminium in the shipyard. It is possible to effect overall economies by its use but as regards cost of the basic material aluminium will probably always be more expensive than steel, mainly because of the much more complicated reduction process, although the difference in price may be lessened as the world output is increased. However, this is likely to be a very long-term process as the situation resembles a vicious circle in that under normal conditions considerably increased demand will usually occur only through reduced prices, while reduced prices are only made possible because of increased demand. Nevertheless, the real demand, as opposed to the present artificial circumstances set up by rearmament requirements, is increasing and eventually it is considered that the shipbuilding industry will be using a much larger proportion than at present and this should have a healthy effect on prices, as the heavier plate and section needed for ships requires less work in the mills than the light sheet and section used by the aircraft and other industries, and at the moment this light material forms a very large proportion of the total output of the aluminium industry.

Because of the higher cost per ton, the relationship between material and labour costs differs from that for steel structures, and more detailed attention to design is justified to secure the greatest economy of weight. This will involve consideration of longitudinal framing systems for superstructures and hulls as against the more normal transverse system usually adopted, and besides being a more economical distribution of the material, longitudinal framing can assist in overcoming any disadvantage of the lower buckling values of the material when this factor requires consideration.

The fact that a practical welding process for aluminium now exists means that weights can be still further reduced and, as with steel, prefabrication of large members to replace castings can be accomplished. The author feels that the alloys in use for shipbuilding in this country today offer the best prospects for the most efficient utilisation of the new welding process and that when it is brought into use in British yards it will speed the trend towards the wider adoption of aluminium alloys for vessels of all types.

Motor Coaster "Western Coast"

Cargo Vessel Delivered to Coast Lines

THE CARGO motor vessel *Western Coast*, built by the Goole Shipbuilding & Repairing Co., Ltd., is the latest addition to the fleet of Coast Lines, Ltd. She is in many ways typical of the modern cargo vessels which are now being built for coastal service, with a shelter deck, and machinery and accommodation aft.

The principal particulars of the *Western Coast* are as follows:

Length o.a.	230 ft. 3 in.
Length b.p.	220 ft.
Depth to shelter deck	21 ft.
Draught	13 ft. 11 in.
Tonnage:	
Gross	791
Net	396
Deadweight	1,239

There are three holds with a total capacity (grain) of 45,200 cu. ft., and tweendecks with a grain capacity of 39,800 cu. ft., giving a total capacity of 85,000 cu. ft. (79,000 cu. ft. bale). Water ballast capacity amounts to 285 tons, and is provided in three double bottom tanks under the holds and the forepeak. Fuel is carried in a cross bunker with a capacity for 38 tons of fuel oil and 13 tons of gas oil. The hatches are fitted with T. & B. patent sliding beams. Nos. 1 and 3 hatches are each served by two 3-tons derricks and No. 2 hatch by two 5-tons derricks. There are six Clarke, Chapman electric winches, two lifting 3 tons at 100 ft. per min., two 2 tons, and two 5 tons. Other deck auxiliary machinery includes electric windlass and capstan. Donkin electro-hydraulic steering gear is fitted, controlled by telemotor from the bridge.

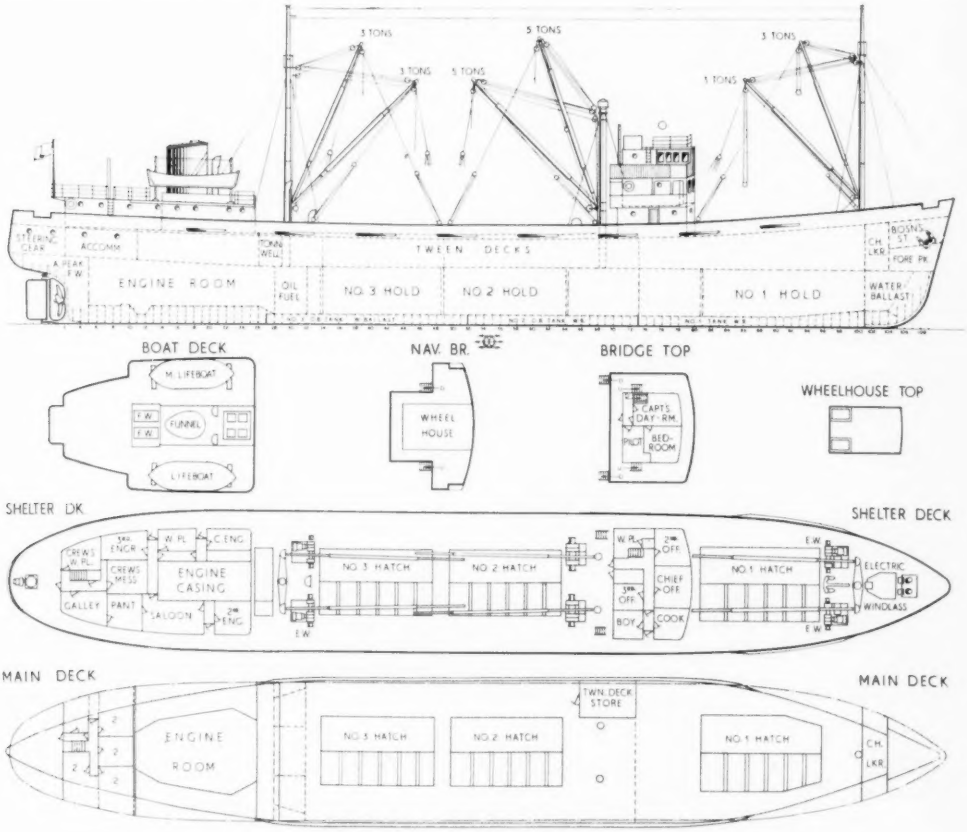
The deck officers are accommodated amidships, as are the cook and boy. The three engineers and eight seamen are accommodated aft, the engineers in single and the crew in double cabins. Also arranged aft are the saloon, the crew's mess, and the galley. Hot water for the cabins and other purposes is supplied by an oil-fired Ideal boiler.

The propelling machinery consists of a 7-cyl. British Polar diesel engine, type M47M, developing 1,140 b.h.p. at 250 r/p.m. and direct coupled to a four-bladed bronze propeller of Stone's manufacture. On trials the vessel attained a speed of 12½ knots. Auxiliary machinery includes an electric centrifugal pump and an electric plunger pump, each of 50 tons capacity, a two-stage air compressor, and emergency lubricating oil and fuel oil transfer pumps. There are two Alfa Laval purifiers, one for fuel oil and the other for lubricating oil.

Electricity is supplied by two diesel generators of 75 kW and one of 19 kW. The auxiliary diesel engines are arranged for fresh water cooling, each having an individual fresh water and salt water pump but with one heat exchanger for all three. An emergency circulating system is arranged from the after peak on a closed circuit system.

THE liner *America* is to call regularly in future at Bremerhaven on her service between New York and Europe.

THREE scholarships in naval architecture and one in marine engineering will be offered for competition in 1952 by the Institution of Naval Architects. All are worth £175 per annum.



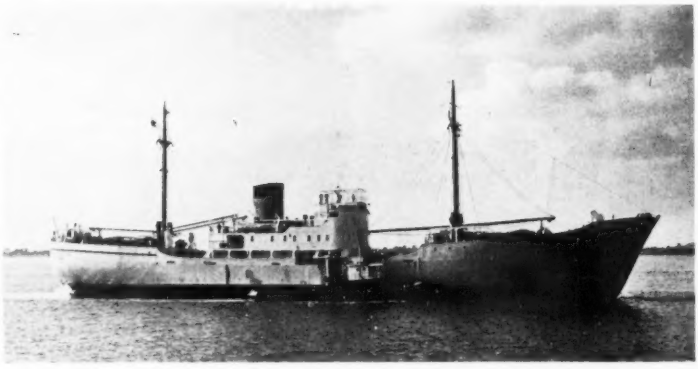
General arrangement of the "Western Coast"

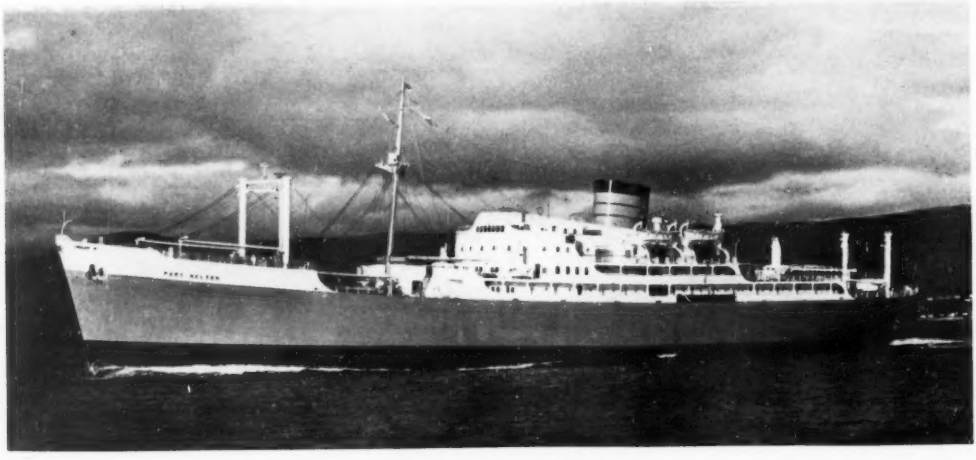
Banana Carrier "Kiffa"

The first of two new fruit carriers reproduced on this page (*left*) is the French motor vessel *Kiffa*, built by Chantiers et Ateliers de Provence, Port de Bouc, for Cie. Maritime des Chargeurs Reunis. She is the first of two sister ships being built at Port de Bouc for the same owners, the other vessel being the *Korba*, to be delivered next spring. The *Kiffa*, when loaded with bananas, has a deadweight capacity of 1,880 tons. Her principal dimensions are 359 ft. 3 in. length o.a., 328 ft. 1 in. b.p., 49 ft. 11 in. breadth moulded and 32 ft. 10 in. depth to upper deck. She has a maximum loaded draught of 20 ft. 8 in. There are five cargo holds, three forward and two aft. Diesel machinery of the M.A.N. type develops 6,500 h.p. and provides the ship with a service speed of 17 knots

German Fruitship "Lichtenstein"

In comparison with the *Kiffa*, the *Lichtenstein*, a banana carrier built by Bremer Vulkan Schiffbau und Maschinenfabrik, Bremen-Vegesack, for the Roland Linie Schiffahrts G.m.b.H., of Bremen, is of 2,353 tons gross and has a deadweight of 3,115 tons. She has dimensions of 315 ft. length b.p., 46.6 ft. breadth and 28.6 ft. depth moulded. As in the *Kiffa*, the *Lichtenstein* has accommodation for twelve passengers. The propelling machinery comprises a 6-cylinder M.A.N. diesel engine of the double-acting type built by the shipbuilders. This engine develops 3,900 b.h.p. and provides the vessel with a speed of 16 knots





Motor Cargo liner from Belfast

Of about 8,375 tons gross, the single-screw motor cargo liner *Port Nelson* has been delivered to the Port Line, Ltd., by the Belfast yard of Harland & Wolff, Ltd. With a well-raked rounded stem, cruiser stern and streamlined superstructure and funnel, the vessel has dimensions of about 490 ft. length o.a., 460 ft. b.p., 64 ft. 6 in. breadth and 41 ft. 6 in. depth moulded to upper deck. There are five cargo holds, three forward and two aft of the machinery space, together with corresponding tweendecks. Nos. 2, 3 and 4 holds and lower tweendecks are insulated for the carriage of refrigerated cargo, while Nos. 1 and 5 holds and lower tweendecks and all five upper tweendecks are arranged for general cargo. The five large cargo hatches are served by two derricks of 15 tons capacity, eight of 10 tons and two of 5 tons. There are also a 3-tons electric deck crane to serve Nos. 4 and 5 hatches, and a 2-tons electric deck crane port and starboard at the after end of No. 3 hatch. The shipbuilders supplied the main engine, which comprises a 7-cylinder two-stroke single-acting B. & W. type diesel engine

NEW CONTRACTS

Yards in Great Britain and Northern Ireland

Shipowners	No. of Ships	Type	Approximate Tonnages		Dimensions (ft.)	Speed (knots)	Propelling Machinery	Total h.p.	Engine Builders	Shipbuilders
			Gross	Deadweight						
Alvion S.S. Corpn., Panama	1	Tanker	—	18,500	—	—	Diesel	—	—	Blythswood S.B.
Alvion S.S. Corpn., Panama	1	Cargo	—	10,000	—	—	Diesel	—	—	Burntisland S.B.
British India S.N. Co.	2*	Cargo	8,800 (each)	10,000 (each)	—	16.5	Steam turbine	—	—	Barclay, Curle
British India S.N. Co.	1*	Cargo	8,800	10,000	—	16.5	Steam turbine	—	—	Scotts' S.B. & E.
British India S.N. Co.	1*	Cargo	8,800	10,000	—	16.5	Steam turbine	—	—	Swan, Hunter & Wigham, Richardson, Wallsend
Moltzau & Christensen, Oslo	1	Cargo liner	—	9,000	—	—	—	—	—	Harland & Wolff, Belfast
Eilert Lund, Bergen	1	Cargo	—	3,000	—	—	Steam	—	—	Hall, Russell
Commonwealth and Foreign Yards										
A.S Kosmos, Sandefjord	1	Tanker	—	34,000	—	—	—	—	—	Gotaverken, Gothenburg
A.S Kosmos, Sandefjord	1	Cargo liner	—	9,500	—	—	—	—	—	Oresundsvarvet, Landskrona
Richard Schroder, Hamburg	1	Cargo	1,500	2,500	—	12	Diesel	1,500	—	Norderwerft, Hamburg
Trelleborgs Angfartygs A.B.	1	Tanker	—	24,000	—	—	Steam turbine	—	—	Kockums M.V., Malmo
Thv. Joh. Kyvik, Haugesund	1	Cargo	—	940	—	11	Diesel	—	—	A Lubeck yard
Bock, Godeffroy & Co., Hamburg	1	Cargo	2,700	5,150	379.2 o.a. and 347.8 b.p. - 52.5 - 21.7	—	Diesel	2,750	—	Lubecker Flenderwerke
Reederei-Union, Kiel	1	Cargo	2,700	5,150	379.2 o.a. and 347.8 b.p. - 52.5 - 21.7	—	Diesel	2,750	—	Lubecker Flenderwerke
United States owners	2	Tankers	—	19,000 (each)	—	—	—	—	—	Hitachi S.B. & E. Co.
United States owners	1	Tanker	—	19,300	—	—	—	—	—	Kawasaki Heavy Industry Co
Norwegian owners	1	Tanker	—	28,000	—	—	—	—	—	Kawasaki Heavy Industry Co.
Finska Angfartygs A.B, Helsinki	1	Cargo	—	1,650	—	—	—	—	—	Scheegs. & Mach.
	1	Cargo	—	2,800	—	—	—	—	—	"De Merwede" v/h van Vliet & Co., Hardinxveld
Finnish owners	1	Tanker	—	16,500	—	—	Diesel	—	—	Werf Jan Smit Czn., Alblasserdam
Triton-Schiffs., Bremen, and Reederei Karl Gross, Bremen (1 each)	2	Cargo	4,400 (each)	6,700 (each)	—	13	Diesel	—	—	Rickmers Werft, Bremerhaven
Alpina Shipping Co., Basel	1	Cargo	—	6,600	—	—	Diesel	—	—	Rickmers Werft, Bremerhaven
Rederi A.B Rex, Stockholm	1	Cargo	—	5,000	—	—	Diesel	—	—	Rickmers Werft, Bremerhaven

* Corrected details of orders previously reported in THE SHIPPING WORLD.

LAUNCHES

Yards in Great Britain and Northern Ireland

Date	Shipowners	Ship's Name and/or Yard No.	Type	Approximate Tonnages		Dimensions (ft.)	Speed (knots)	Propelling Machinery	Total h.p.	Engine Builders	Shipbuilders
				Gross	Deadweight						
Oct. 19	Rivers S.N. Co.	(151)	Coaster	550	—	—	—	—	—	—	Clelands (Successors)
Oct. 29	Esso Pet. Co.	*Esso Abingdon*	Oil barge	—	518	168 - 32.5 - 8.5 (draught)	8.5	4-cyl. Crossley diesel	400	—	Richard Dunston, Hessle
Nov. 1	South Eastern Gas Board	*Croydon* (346)	"Flat-iron" collier	1,871	2,825	264.5 b.p. - 39.5 - 18.5	—	8-cyl. diesel	1,150	British Polar Engines	Burntisland S.B.
Nov. 1	Lamport & Holt Line	*Romney* (1214)	Cargo liner	7,000	—	435 b.p. - 63 - 39.25	—	Dble.-red. geared turbine	—	—	Cammell Laird
Nov. 3	Kingston S.T. Co.	*Kingston Jacinth*	Trawler	750	—	189 - 32 - 16.25	—	Tr.-exp. steam	—	Chas. D. Holmes	Cook, Welton & Gemmell

TRIAL TRIPS

Yards in Great Britain and Northern Ireland

Date	Shipowners	Ship's Name and/or Yard No.	Type	Approximate Tonnages		Dimensions (ft.)	Speed (knots)	Propelling Machinery	Total h.p.	Engine Builders	Shipbuilders
				Gross	Deadweight						
—	British India S.N. Co.	*Arusha* (417)	Tug	280	—	112.5 - 32 - 13.25	12	Tr.-exp. steam	800	White's Mar. Eng. Co.	Henry Robb
—	National Sea Products, Halifax, N.S.	*Cape Beaver* (1371)	Trawler	365	—	152.5 o.a. and 137 b.p. - 26.5 - 13.75	11.5	Tr.-exp. steam	700	Amos & Smith	Cochrane & Sons
—	Knut Knutsen O.A.S., Haugesund	*Knut Knutsen* (433)	Tanker	15,700	24,800	589 o.a. and 560 b.p. - 80 - 42.25	14	6-cyl., 2-str. Doxford diesel	6,800	N.E. Marine	Furness S.B.
Oct. —	Port Line	*Port Nelson* (1437)	Cargo liner	8,375	—	490 o.a. and 460 b.p. - 64.5 - 41.5	—	7-cyl., 2-str. B. & W. diesel	—	Shipbuilders	Harland & Wolff, Belfast
Nov. 1	Constantine Shipping Co.	*Eskwood*	Coastal and short-sea cargo	1,273	1,675	214.5 b.p. - 35.33 - 16	—	4-cyl., 2-str. diesel	640	British Polar Engines	Burntisland S.B.

MR. D. E. JEWITT, who had been associated with the marine work of the British Thomson-Houston Co., Ltd., since 1910, has retired after 45 years' service with the company. Mr. Jewitt, after practical experience with Campbell & Isherwood, Ltd., joined B.T.H. at Rugby in 1906. He subsequently gained considerable experience with the installation and maintenance of B.T.H. generating sets and motors, in Clyde-built warships. In 1922 the marine department was established, with Mr. Jewitt as chief assistant to the manager. He was appointed engineer, marine department, in 1943

MR. P. D. P. KEMP is a newly appointed director of Saunders-Roe (Anglesey), Ltd. Mr. Kemp joined the company, then known as Saunders Engineering & Shipyard, Ltd., in 1946, and has been sales and contracts manager since June 1949. He will continue to be responsible for the company's sales activities, contract negotiations and publicity

MARITIME NEWS IN BRIEF

From Correspondents at Home and Overseas

THE U.S. Military Sea Transport Service has asked the U.S. Maritime Administration to make available to it the liner *General Gordon*, which American President Lines has been operating in the Pacific. It has also tentatively agreed to charter the entire fleet of five ships owned by the American Hawaiian Line. This line has applied for permission to charter seven Victory ships to replace them. The M.S.T.S. has recently taken over the liner *Washington*, formerly operated by United States Lines. It will be used primarily to carry displaced persons.

THE International Civil Aviation Organisation is to help Indonesia to build up and operate an internal airline network. Eight ICAO experts are being sent to Indonesia, including a chief of operations, instructors and an economist. They will assist the Indonesian Directorate of Civil Aviation in the supervision of the country's air navigation facilities and in a training programme designed to develop native personnel.

FOREIGN imports through the port of Bristol during October amounted to 249,873 tons, as compared with 238,407 tons in October 1950. Foreign exports, at 49,233 tons, showed a considerable improvement over the October 1950 total of 7,720 tons. Coastwise shipments also showed increased totals.

MR. J. G. DUMSDAY and Mr. J. O. Plowright have been appointed directors of the Scottish Tanker Co., Ltd., which was formed last year in association with The Clan Line Steamers, Ltd.

MR. C. H. T. JOHNSON and Mr. S. R. Tanner have been appointed to the board of Decca Radar, Ltd.

* * * *

AT THE annual meeting of the Newport section of the Bristol Channel District Association of Chartered Shipbrokers, Mr. N. L. Gibbs, a partner in Gibbs & Co., shipowners and shipbrokers, and a director of Dunn & Co. (Newport), Ltd., shipbrokers, was elected chairman. Mr. F. H. Lawson, of Richard W. Jones & Co., was elected vice-chairman, and Mr. G. W. R. Tout was re-elected honorary secretary. Mr. Evan E. Rees and Mr. A. H. Hodding were elected members of the committee in place of Mr. S. E. Ward and Mr. H. A. Barber.

THE EIGHTIETH anniversary of the Hamburg-South America Line occurs this month. The company, which in 1939 owned a fleet of some 400,000 tons gross headed by the *Cap Arcona* (27,000 tons gross), is now rebuilding its fleet. At present it includes three 7,000-tons gross motorships of the *Santa* class, while a fourth is on the stocks.

MR. N. E. ROWE has been appointed technical director of Blackburn & General Aircraft, Ltd., as from January 1. Air Vice-Marshal H. N. Thornton is also joining the board and will be responsible for sales, while Capt. C. E. Ward has been appointed London manager, with responsibility for the London office.

A PLAN for the dredging of a number of Brazilian seaports, over a period of two years, is reported by the *Fortnightly Review* of the Bank of London & South America to have been approved by President Vargas. The estimated cost is Cr.$300 million (about £6 million).

THE fish factory ship *African Queen*, which was to have taken part in the Colonial Development Corporation's abandoned Atlantic Fisheries project, is laid up in the Tyne and is being offered for sale.

PALMERS HEBBURN CO., LTD., Jarrow-on-Tyne, have received the small naval aircraft transport *Seatox* for overhaul and conversion prior to the ship being transferred to the Royal Fleet Auxiliary.

MR. J. C. MATHER, a director of Cammell Laird & Co., Ltd., has been appointed chairman in succession to the late Sir Robert Johnson.

MR. R. L. NESBITT, naval architect of Short Brothers, Ltd., Sunderland, has been elected a director.

* * * *

THE passenger liner *Empire Brent*, at present undergoing an extensive refit at the yard of Barclay, Curle & Co., Ltd., will shortly be recommissioned as the *Captain Cook* for the emigrant service to New Zealand. Built for the Donaldson Atlantic Line's Canadian passenger service by the Fairfield Shipbuilding & Engineering Co., Ltd., the ship was first commissioned in 1925 as the *Letitia*, and was a sister ship to the *Athenia*. The refitting work includes an extensive new installation of Marconi radio and radar equipment.

SYSTEMATIC minesweeping in Danish waters has ended after six years of constant work since the end of the war. During the last six years, Danish minesweepers have covered 1,390,000 nautical miles, sweeping 218 different routes and special areas. Shipping routes in Danish waters are now considered sufficiently swept.

A PAPER entitled "Marine Transport of Oil in Bulk" is to be read to the Institute of Transport on November 19 by Mr. W. G. Weston, general manager, marine department, Anglo-Saxon Petroleum Co., Ltd.

A DEMONSTRATION of the Pongracz single spindle automatic screw machine will be given by Newman Industries, Ltd., at the Army & Navy Stores, London, S.W.1, from November 20 to 23, inclusive.

MR. C. H. R. WILLIAMS has been appointed joint deputy underwriter of the Union Insurance Society of Canton, Ltd., as from December 1.

MR. E. H. DISCOMBE, a delegate director and commercial manager of Murex Welding Processes, Ltd., has retired after over 35 years' service with the company.

MR. EDWARD NORMAN-BUTLER has been appointed a director of the Australia & New Zealand Bank, Ltd.

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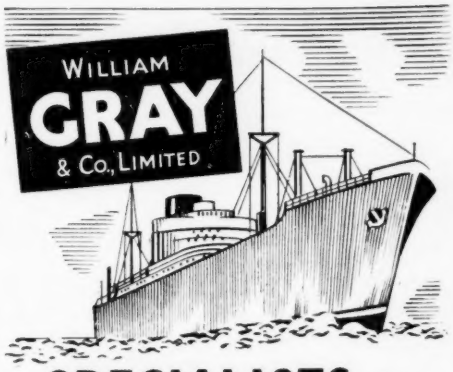

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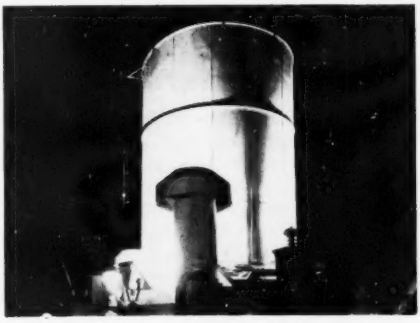

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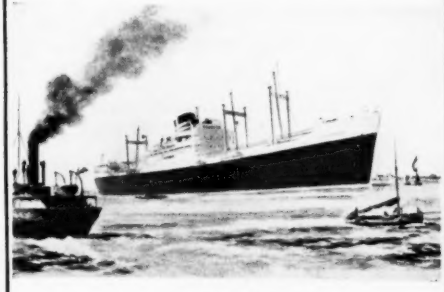

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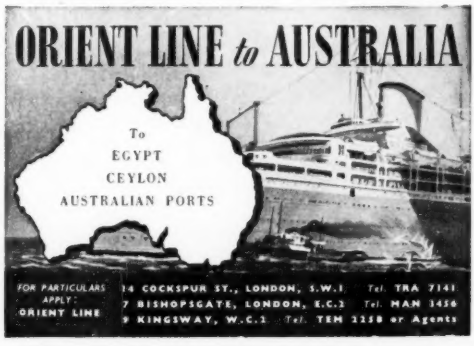

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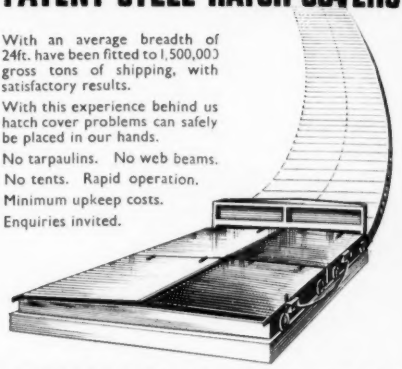

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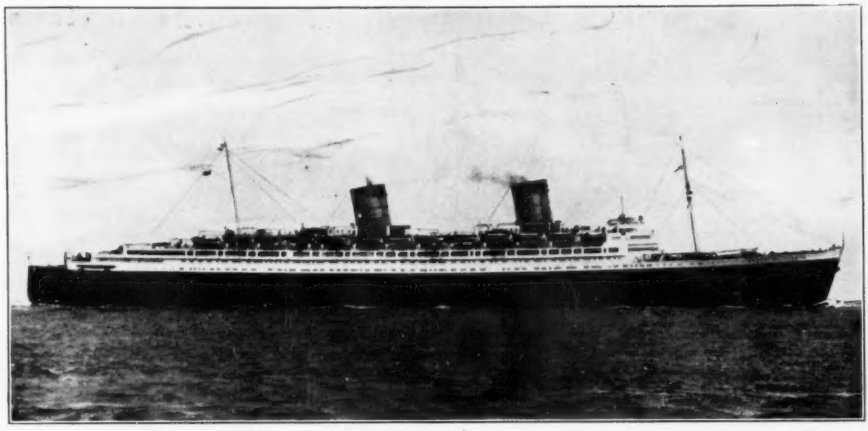

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Published every Wednesday by the Proprietors, THE SHIPPING WORLD LTD. at Effingham House, Arundel Street, Strand, London, W.C.2, and Printed in Great Britain by the Press at Coombelands Ltd., Addlestone. Agents for Australia and New Zealand: Gordon & Gotch (Asia), Ltd.; for South Africa: Central News Agency, Ltd.; for Canada: Gordon & Gotch (Canada), Ltd.; for U.S.A.: The International News Co. Registered as a Newspaper.